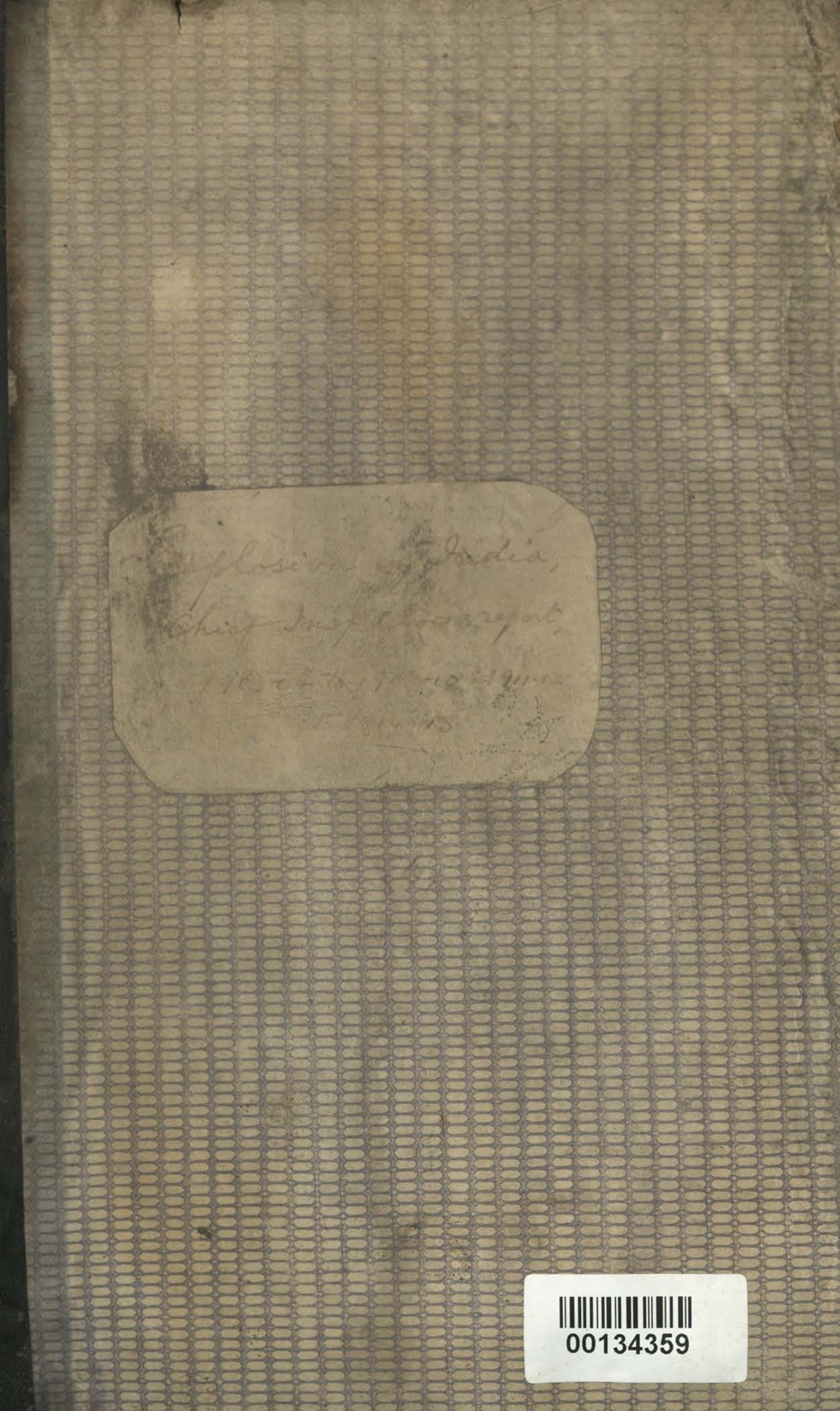
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BOMBAY BRANCH
OF THE
ROYAL ASIATIC SOCIETY.
TOWN HALL, BOMBAY.

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Indian Explosives Act (IV of 1884).

FIFTH ANNUAL REPORT

OF THE

CHIEF INSPECTOR OF EXPLOSIVES IN INDIA,

BEING HIS

Annual Report for the Year ending 31st March 1904.

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CALCUTTA:
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1904.

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Fifth Annual Report of the Chief Inspector of Explosives in India.

No. 230.

FROM

MAJOR C. A. MUSPRATT-WILLIAMS, R.A.,
Chief Inspector of Explosives,

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,
HOME DEPARTMENT.

Calcutta, the 31st March 1904.

SIR,

Introductory.

I HAVE the honour to submit herewith a report of the work of my Department, for the year ending 31st March 1904.

Number of explosives magazines.

2. During the year 1903, 101 licenses were granted in British India under Rule 17 of the Rules to regulate the manufacture, possession, and sale of explosives. The number of magazines licensed was 146, and is in excess of the number of explosive licenses granted, because in a number of cases a firm has two or more magazines licensed on the same premises under one license. A statement, showing the number and location of the magazines, and also the number of licenses granted in each Presidency or Province, is given in Appendix A. From this statement it will be seen how widely these magazines are dispersed over the greater portion of British India, and consequently how much time has to be spent in getting from place to place, which necessarily, to a certain extent, curtails the number of inspections that can be made during the year.

Inspection work during the year.

3. During the year 284 inspections of magazines were made ; all the magazines, except a few that were given up by the licensees during the year, were visited once, and a considerable number two or three times. Those magazines are inspected most frequently, which are situated in the neighbourhood of towns, or in populous localities, or which contain large quantities of explosives, or any explosive, which on account of greater susceptibility to decomposition, it is considered advisable to examine and test more often than other explosives. The Roburite Factory at Karachi was visited twice. In addition to these inspections, some oil installations and tank depôts and a number of registered premises were visited.

Condition of magazines.

4. The magazines generally are in good order, and I have found magazine owners as a rule most willing to carry out my recommendations, even when involving considerable expense, and my thanks are due to them for making my duties easy in this respect.

Condition of explosives in magazines.

5. Owing to the unprecedentedly high floods in Madras, during the North-East Monsoon, water got into some of the dynamite magazines at this place, rising a little above the level of the top of the trestles, on which the boxes of dynamite were stacked, and consquently the lowest tier of the boxes got wet. On examining some of the wet boxes and their contents at my inspection, I found that in some cases the water had penetrated the waterproof lining inside the boxes, wetting and discolouring the packages of dynamite, and liberating free nitro-glycerine. As dynamite in this state is dangerous, I reported the matter to the Commissioner of Police, Madras, recommending that the firms, owning the magazines, should be instructed to open one by one all boxes of dynamite which water had reached, and to carefully examine their contents and to put on one side for destruction by burning in small quantities, for which I gave full instructions, all packets that have been affected by water, which would be shown by discolouration of the wrappers. About 1,800 lbs. of dynamite have been destroyed.

The Inspector of Explosives has just lately reported that the physical condition of 141 lbs. gelignite in a magazine belonging to the Godavari Coal Co., at the Perakonda Graphite Mines, is not good, as it is soft and showing signs of exudation. I have recommended its destruction.

With the exceptions mentioned above, the physical condition of all the explosives in the different magazines has been found to be good. None of the samples of explosives taken at inspections failed to pass the heat tests, which were carried out by the Chemical Examiners at Calcutta, Bombay, Madras and Rangoon, and the Testing Officer at Karachi.

Thefts.

6. No thefts of explosives from magazines were reported to me during the year.

Accidents.

7. No accidents have occurred in the magazines or in the one factory (Roburite Factory) licensed in this country. A list of other accidents by fire or explosion that have occurred with explosives, inflammable substances, dangerous chemicals, etc., between the 1st January 1903 and the 31st December 1903, and that have been brought to the notice of this Department, is given in Appendix B, and gives a short account of each one. It will be seen from a persual of those details that the accidents have mostly taken place owing to gross carelessness, or through utter neglect of ordinary precautions. In all, there were 43 accidents, causing 41 deaths and injuries to 62 persons. The death-rate has practically been the same for the last four years, and cannot be regarded as a very high one, although it might very well have been less. Comparative statements given in Appendices C and D show the total number of accidents, and of persons killed and injured, during the four years, 1900 to 1904.

Gunpowder.

8. There were five gunpowder accidents during the year, causing the death of nine persons, and injuries to one. The suicidal practice of pounding and mixing the ingredients of gunpowder in a stone mortar with an iron bar or similar instrument supplies its yearly quota of victims.

Dynamite.

9. Dynamite (seven accidents) was responsible for five deaths and injuries to eighteen persons, which is in excess of previous years, *vide* Appendix C. This is due chiefly to four accidents during blasting operations at the Nishpa tunnel on the Quetta-Nushki Railway, which is at present under construction. By these accidents fourteen coolies were injured and four others lost their lives, and the accidents can only be termed preventable ones. I cannot too strongly impress on those engaged on blasting operations, the following precautions, which, if observed, will certainly lessen the number of accidents :—

1. Never approach a fuze which has apparently missed fire for at least half an hour ;

2. Never use an iron or steel tool for ramming charges ;

3. Even with wood implements, squeeze the cartridges home gently in the bore hole, and never ram them with any force that might be liable to establish dangerous friction ;

4. After any blast, search should be made to see that no unexploded explosive remains in any of the bore holes, or in the débris produced by the explosive ;

5. Never drill in or too near old blast holes.

Fireworks.

10. Twenty accidents from fireworks have been reported to this Department, causing eight deaths and injuries to twenty-six persons. Most of the accidents are caused by the Sulphur Chlorate combination of fireworks, which are prohibited in England, but which the Government of India, after due consideration of all the points at issue, decided not to prohibit in India.

Petroleum.

11. There were nine accidents from petroleum reported during the year, which were responsible for thirteen deaths and injuries to fourteen persons. As usual, most of these were caused by ordinary lights being brought into close proximity to petroleum. It is certainly unadvisable, if it can possibly be avoided, to carry on work with petroleum between sunset and sunrise, and it is always likely to cause accidents, but if the work must be carried out after dark, some one should certainly be responsible that only safety lamps or electric hand lamps are used. As in previous years, several accidents have been caused by persons taking a light and looking into Railway oil tank wagons to see how much oil was left in them or whether they were empty, instead of using a stick as a gauge, and naturally they have paid the penalty of their temerity. The Railway authorities have now, I believe, taken the matter up and have drawn up some rules, which have been referred to me, and which I am of opinion will render these accidents less likely in future, as Station Masters will be made more responsible for them. I would point out that though petroleum and its vapour are both inexplosive in themselves and only inflammable, yet the vapour when mixed with air in certain proportions is violently explosive, if ignited. Luckily the proportions necessary to form an explosive mixture are very limited, and are more likely to occur in an empty or half empty tank than in a full one. The mixture begins to be inflammable when there is about 1·8 per cent. of vapour. Two to four per cent. of vapour makes the mixture explosive, but when the amount of vapour exceeds this maximum, the liability to explosion begins to disappear, but the mixture continues to be highly inflammable.

A great fire from petroleum broke out at 6 P.M. on the 31st March 1903 at Budge Budge, on the bank of the river Hooghly, about 14 miles from Calcutta, where all the case oil godowns and bulk oil installations of the different firms, trading in oil, are grouped in one big depôt. The case oil godowns are situated on the bank, while the bulk oil tanks are placed a little further inland. The fire originated from some cause unknown at one of the godowns at the extreme north of the whole depôt, in which were stored some four lakhs of cases, about (3,200,000 gallons) and 40,000 tins (about 160,000 gallons). The fire raged furiously but without any explosion for some days, and was not actually extinguished for about a fortnight. Luckily, while it was at its worst, the wind kept in a southerly direction, otherwise it is probable that the rest of the depôt would have become involved, instead of the fire being confined as it was to the one shed. There was practically very little oil liberated, presumably owing to its being vapourised by the great heat, and no oil got outside the retaining walls or bunds. Nothing, of course, could be done towards putting out the fire, so all attention was turned to preventing the next godown and the nearest bulk oil tank from catching fire by playing water on them and endeavoring to keep them cool, and by removing the cases of oil from the godown. I personally am of opinion that oil in bulk oil tanks is less likely to catch fire than oil stored in godowns in cases and tins, a fact which I believe is recognised by insurance companies in charging premiums, and hence, I think, it is unadvisable to have the two kinds of storage of such large quantities of oil in such close juxta-position

as at Budge Budge. Owing to the increase in the oil trade, the Budge Budge depôt has outgrown itself, and the oil tanks, case oil sheds, and other buildings are much too close together for safety, and there is considerable danger to the whole depôt in the case of fire breaking out at any particular point. It is certainly most desirable that the oil tanks should be taken from their present position, where they are too close to the workshops, in which the tins are made and filled with oil, and removed further inland, each tank being placed in its own enclosure of retaining walls or bunds and separated at least 100 feet from any other tank. This would mean that the two principal danger areas, namely, the bulk oil storage and the case oil storage, would be at some considerable distance apart with the tinning factories between them. I believe a scheme of this kind is about to be proposed by the Port Commissioners of Calcutta, and I cannot too strongly recommend that it should be adopted and carried out as expeditiously as possible. There may probably be some opposition to the scheme, but such opposition should be overcome forthwith, as, in a case of such importance and urgency, private interests should be made to give way at once to the interests and preservation of general public safety. In connection with this subject I think it is as well to repeat what I said in my Annual Report of last year, namely, that the great point with all petroleum installations, as with explosives factories, is to sub-divide the complete installation or whole danger area into a series of smaller danger areas, so enclosed, shut off, or screened from one another that any accident or disaster in one of them will not involve the others or the main installations.

Chemicals.

12. Two accidents from chemicals were reported during the year. One caused no loss of life, but the other was responsible for the death of six natives and injuries to three others. It took place in an ice factory at Benares, and was due to an ordinary light being brought near a leakage of ether, and, as the necessary proportion of ether vapour and air to form an explosive mixture happened to be present, a severe explosion took place.

Government accidents.

13. Only one Government accident was reported to this Department during the year, by which four native sappers employed in drilling blast holes on the Chitral Drosh road were injured. The details are given in Appendix E.

Imports of explosives.

14. Three millions seven hundred and seventy-eight thousand eight hundred and fifty-six pounds of explosives, or roughly about 1,889 tons, were imported by sea into British India in the year, the value being R20,19,446. Last year there was an increase of 135 tons in the imports, but this year the increase is considerably greater, *viz.*, 661 tons, *vide* Appendix G. Full details showing the different kinds of explosives imported during the year and the value of each are given in Appendix F.

15. Some points of interest in connection with the work done by this Department during the year are mentioned below:—

(*a*) The work has increased considerably during the year, and I am glad to say the Department appears to be getting well known, judging by the number of enquiries that are made to it regarding explosives and every variety of dangerous goods, both by Government officials and the mercantile community.

Importation of explosives.

(*b*) A rather important amendment was made to the rules issued by the Government of India for the transport and importation of explosives, *vide* Notification No. 2346, dated the 11th June 1903, given in Appendix H.

Temporary storage of explosives in floating magazines.

(*c*) An amendment to Rule 19-A. of the Rules for the manufacture, possession, and sale of explosives was made, allowing of the temporary storage of explosives in floating magazines. This amendment is given in Appendix J.

(*d*) This Department has suggested the desirability of having one set of consolidated rules for the whole of British India for explosives, petroleum, and Carbide of Calcium, instead of a set of rules for each Province or Presidency. I have drawn up and submitted such a set, bringing the rules up to date and introducing provisions for future eventualities. Unfortunately, I believe that, though this arrangement is permissible under the Explosives Act, it is not so under the Petroleum Act, as at present constituted. A number of amendments to the rules under the Explosives Act, including those referred to in paragraphs 17(*c*), 17(*d*), and 17(*e*) of my last Annual Report, are embodied in the consolidated rules, and they with the other rules are at present all under the consideration of the Government of India.

Consolidated rules for explosives, petroleum, and Carbide of Calcium.

(*e*) Rules for the carriage of petroleum by native passenger ships have been drawn up and finally issued by the Government of India in the Finance and Commerce Department, *vide* Notification No. 5100-S.R., dated the 20th August 1903, given in Appendix K.

Carriage of petroleum by native passenger ships.

(*f*) Under the advice of this Department an amendment has been made to the rules for the possession and transport of petroleum to the effect that "every tank or other receptacle for the storage of petroleum in bulk shall be protected by an efficient lightning conductor, provided that a tank or receptacle which is not of sufficient capacity to contain 10,000 gallons of petroleum need not be so protected, if it is so situated as not to be liable to cause danger in the event of the petroleum being ignited, *i.e.*, if it is not in close proximity to any other such tank, or receptacle, or to any buildings, and if it is surrounded by a wall or moat, or combination of both, sufficient to prevent the flow of petroleum beyond certain circumscribed limits in the event of the escape of the whole of the contents of the tank when full.

Lightning conductors for oil tanks.

The lightning conductor has to be tested not less than once a year.

(*g*) Model specifications of tanks for the storage of petroleum in bulk and of screen walls for such tanks have been circulated by the Government of India to Local Governments as a guide to the conditions which it may be advisable to adopt in the licensing of future installations. These specifications are given in Appendix L.

Model specifications of petroleum tanks and screen walls.

(*h*) Notes on the construction and managemant of small petroleum installations or tank depôts, such as may be seen near almost every railway station, were drawn up by this Department to assist District Officers in knowing what points to observe in granting licenses for small depôts. These notes were circulated to Local Governments and are given in Appendix M.

Construction and management of small petroleum installations or oil tanks.

(*i*) The question of the proposed extension of the Bombay docks has come to the notice of this Department in connection with the fact that such extension will bring the docks in close proximity to the oil installations. The installations at present in existence are those belonging to the Standard Oil Co., the Royal Dutch Co., and the Shell Transport Co. The Standard Oil Co. have only lately erected their tanks, but have not stored any oil in them. The other two Companies, who, I understand, are combining as the Asiatic Petroleum Co., have had their premises for some time, but their present leases are now drawing to an end. I believe that the question as to the risks to the proposed docks from the oil tanks, and as to whether such risks cannot be practically eliminated by means of retaining walls, fire

Extension of the Bombay docks and proximity to oil installations.

screens, and the provision of special underground tanks for running off the oil in case of fire, has been referred to Dr. Boverton Redwood and His Majesty's Chief Inspector of Explosives, England. The unexpected, however, sometimes takes place in spite of the utmost human precautions, and I am personally of opinion that, taking into consideration the value of the docks as compared with the compensation that would have to be paid if the oil tanks were removed from their present positions, it would be wiser in any case to make certain of absolute safety for the docks by the removal of the oil tanks rather than to run the chance of any risk, however small, by leaving them where they are. I am aware that in England in several places the docks and oil installations are close together, but in England there is much more difficulty than in India in getting available and unobjectionable sites for oil installations. Only lately the Burma Oil Co. have been able to get a site in a different part of Bombay for the oil installations they intend erecting.

(*j*) Certain precautions to be taken in accepting Petrol or Motor Spirit, Naphtha, Benzoline, Gasoline, Benzine and other dangerous petroleum, when tendered for carriage by railway, were suggested by this Department, and were given effect to in Government of India, Public Works Department, Circular No. 1-Railway, dated the 24th June 1903, *vide* Appendix N.

Carriage of petrol and other dangerous petroleum by railway.

(*k*) Draft conditions and rules to be made by Local Governments in granting special licenses without fee *under section* 5 *of the* Indian Petroleum Act, 1899 (VIII of 1899), to the owners of motor cars for the possession of petrol for use in such cars and for its transport on such cars for the purpose of use therein have been drawn up and submitted to Local Governments, who are now about to issue them, modified as required, according to local conditions.

Special licenses to owners of motor cars for the possession and transport of petrol.

(*l*) A rather important amendment is being made to the rules for the possession, sale, and transport of Carbide of Calcium, laying down that where an applicant for a license proposes to engage in the manufacture of Acetylene gas, the generating apparatus to be used by the licensee must, if manufactured in India, have been examined by an officer appointed by the Local Government in this behalf, and certified by him to be suitable, or, if imported, must either have been so examined and certified, or be a type approved by the Committee on Acetylene Generators appointed by the Department of His Majesty's Inspectors of Explosives, England.

Acetylene generators.

(*m*) The Government of India rules for open lines of railway in British India have, after reference to this Department, been amended so as to admit of concentrated sulphuric acid (*i.e.*, of a specific gravity, not less than 1·84) being packed in strong hermetically sealed iron or steel drums, which must be in good condition and free from rust, provided that the limit of the weight of a package is five maunds.

Packing of concentrated sulphuric acid.

I have the honour to be,

SIR,

Your most obedient Servant,

C. A. MUSPRATT-WILLIAMS, MAJOR, R.A.,

Chief Inspector of Explosives in India.

APPENDIX A.

List of Magazines and Licenses granted under Rule 17 for the year 1903.

Province or Presidency.	District.	Magazines.			Licenses.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Assam	Cachar	2	...	2	2	...	2
	Lakhimpur	1	...	1	1	...	1
	Total	3	...	3	3	...	3
Bengal	Bankura	2	...	2	1	...	1
	Burdwan	20	...	20	17	...	17
	Darjeeling	2	1	3	2	1	3
	Gaya	1	5	6	1	3	4
	Hazaribagh	11	1	12	9	1	10
	Hooghly	4	...	4	1	...	1
	Manbhum	15	5	20	12	4	16
	Total	55	12	67	43	9	52
Bombay	Bombay	9	3	12	4	3	7
	Karachi *	8	...	8	4	...	4
	Total	17	3	20	8	3	11
Burma	Katha	1	...	1	1	...	1
	Mergui	1	...	1	1	...	1
	Ruby Mines	1	...	1	1	...	1
	Syriam	2	...	2	1	...	1
	Total	5	...	5	4	...	4
Central Provinces	Bilaspur	1	...	1	1	...	1
	Chindwara	...	1	1	...	1	1
	Jubbulpur	2	...	2	1	...	1
	Raipur	4	...	4	4	...	4
	Saugor	1	...	1	1	...	1
	Total	8	1	9	7	1	8
Madras	Godaveri	5	...	5	2	...	2
	Madras	17	...	17	5	...	5
	Nellore	4	...	4	2	...	2
	The Nilgiris	5	...	5	3	...	3
	Vizagapatam	4	...	4	2	...	2
	Total	35	...	35	14	...	14
United Provinces	Cawnpur	1	1	2	1	1	2
	Dehra Dun	1	...	1	1	...	1
	Gharwhal	1	...	1	1	...	1
	Lucknow	1	...	1	1	...	1
	Meerut	1	...	1	3	...	3
	Shahjehanpur	1	...	1	1	...	1
	Total	6	1	7	8	1	9

SUMMARY.

Assam	3	...	3	3	...	3
Bengal	55	12	67	43	9	52
Bombay	17	3	20	8	3	11
Burma	5	...	5	4	...	4
Central Provinces	8	1	9	7	1	8
Madras	35	...	35	14	...	14
United Provinces	6	1	7	8	1	9
Grand Total	129	17	146	87	14	101

* At Karachi there is in addition a Roburite Factory licensed under Rule 18.

APPENDIX B.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1903 to 31st December 1903.

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured
			Explosives.			
1	6th Mar. 1903	Gunpowder .	Bhavni, Coimbatore.	This accident took place at a festival at which small quantities of gunpowder are fired at intervals. The country gunpowder is rammed into iron tubes, about 6 inches long and 2 inches in diameter, attached to a log of wood placed in the ground. Some of the gunpowder, about 16lbs. in all, exploded unexpectedly, and two men died of burns received from this explosion.	2	...
2	5th June 1903	Country gunpowder.	Salem . .	Two coolies were engaged by a merchant to blast rocks in sinking a draw well in the backyard of his house. The coolies filled the blast holes with country gunpowder, and endeavoured to ignite the gunpowder by throwing burning coals at the holes from outside the well. As the gunpowder did not ignite, the coolies, after waiting a little time, got into the well and began to drill new holes near the old ones, when an explosion took place, and they were so seriously injured that they died from the effects.	2	...
3	31st July 1903 .	Country gunpowder.	Chinna, Agaram, Cuddalore.	Two men were mixing the ingredients for the manfacture of gunpowder in a stone mortar and were pounding the mixture with an iron bar with the natural result that it exploded, causing them such injuries that they died from the effects.	2	...
4	4th Aug. 1903 .	Country blasting powder.	Bombay . .	A blasting charge had been laid, and the fuzes ignited. As the charge did not explode, after waiting a little time, the native employed in the blasting operations went towards the charge to see what had happened. As he got near, the charge exploded and injured him so severely that he died a few hours later.	1	...
5	26th Oct. 1903 .	Country gunpowder.	Coimbatore District.	Three natives were manufacturing, without a license, and were pounding together the ingredients in a wood mortar, when an explosion took place, which caused severe injuries to all three.	2	1
				TOTAL .	9	1
6	23rd Jan. 1903 .	Dynamite .	Nishpa on Quetta-Nushki Railway (under construction).	An explosion occurred at the east heading of Nishpa Tunnel. A charge of dynamite, which had missed fire in the floor and got covered up by debris and remained unnoticed, exploded evidently under the blow of a pick, when the workmen were mucking out.	1	7
7	31st Jan. 1903 .	Dynamite .	Coorg . .	The report of the Executive Engineer, Mercara, on this accident is given below :—"Blasting operations with dynamite and a black covered fuze were in progress; Balappo (the man who lost his life) had already fired 7 charges and went up to fire the last; no one appears to have seen him do this as he called out a warning to them. The charge exploded and the man was found with the upper portion of his head blown off. It seems evident that Balappo held the light to the fuze after it had ignited, and continued doing so until the charge exploded. The men examined state that with the fuze in use it is difficult at times to see whether it has ignited or not owing to the black covering not showing signs of discolouration. I imagine that in these cases the fuze must be damp and only smouldering, and intend in future to use a white covered fuze."	1	...
8	16th Feb. 1903 .	Dynamite .	Madapur Bridge, Coorg.	Executive Engineer, Mercara, reports this accident as given below :—"Two charges of dynamite were fired together, one of which did not explode. After waiting a considerable time, the Sub-Overseer in charge went up and poured water into the hole until the fuze was saturated; and, giving strict orders that it was not to be tampered with, went to fetch another charge with which to fire the first one. In his absence the contractor and another man removed the tamping, the fuze, the detonator, and the dynamite, and thinking the hole was not deep enough commenced to deepen it by means of a short steel jumper and a sledge hammer, holding the jumper himself and a cooly using the hammer. A portion of the charge must have been left in the hole, as an explosion occurred and the contractor's hands were badly injured by it and the cooly's eyes damaged by grit and sand.	...	2

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
				Explosives—*contd.*		
9	3rd Apl. 1903 .	Dynamite .	Nishpa Tunnel .	An explosion occurred at 3 A.M. on the 3rd April owing to an unfired blast of the previous day being struck by a cooly with his jumper when drilling fresh blast holes. Five coolies were injured more or less severely.	...	5
10	10th Sept. 1903.	Dynamite .	Nishpa Tunnel .	This explosion occurred owing to the jumpers of the coolies preparing blast holes coming into contact with misfired cartridges from previous blasts. The explosion killed two men and severely injured another.	2	1
11	16th Nov. 1903 .	Dynamite .	Nishpa, Quetta-Nushki Railway.	Two coolies were drilling in an old blast hole, which was strictly against orders. Evidently there was a partially fired charge in it, as an explosion took place, killing one man and injuring the other.	1	1
12	30th Dec. 1903 .	Dynamite .	Coorg . .	While quarrying stone on the Mercara-Periambody Road, it appears that a misfire occurred and two coolies were sent out the next morning to jump a fresh hole. Instead of doing so, they tried to extract the dynamite which exploded.	...	2
				TOTAL .	5	18
13	8th May 1903.	Fireworks .	Maldah . .	Four women were grinding ingredients for the manufacture of bombs, when there was an explosion probably caused by friction, and this communicated itself to a heap of powder in the same room. The four women were killed.	4	...
14	6th June 1903 .	Fireworks, consisting of charcoal, saltpetre, sulphur and iron powder.	Calcutta . .	A man was holding a quantity of this mixture in a paper in his hand, and was testing it by putting small quantities into the fire, with the result that the whole lot caught fire and he was severely burnt.	...	1
15	1st Oct. 1903 .	Fireworks; chlorate of potash and red arsenic (sulphide of arsenic).	Bombay . .	Two men were mixing chlorate of potash and sulphide of arsenic and were using a heavy iron chisel as a mixer, with a result that the mixture was ignited and they were both severely burnt.	...	2
16	12th Oct. 1903 .	Fireworks; crackers consisting of chlorate of potash, red sulphide of arsenic and small pieces of stone.	Jorabagan, Calcutta	Nine native lads were manufacturing these crackers (bombs) when one of them exploded and the rest of the ingredients lying about caught fire and there was a general explosion, causing severe injuries to seven of the lads, and light injuries to the other two.	...	9
17	14th Oct. 1903 .	Fireworks; Chinese crackers and pyrotechnic matches.	Bombay . .	Extracts from report of Commissioner of Police, Bombay:— "A licensed dealer in fireworks bought a box of Chinese crackers. The box was covered with matting which he cut open with a knife and the box itself he forced open with his hands. He had taken out about half the crackers and placed them in the centre of the shop, when some pyrotechnic matches, manufactured in Europe, which he had previously bought and which were lying in front of the shop, took fire. The owner tried to throw these on to the street, but failed to do so quickly enough to prevent his whole stock from exploding and setting fire to the house. No one was in the shop at the time except the owner, who jumped into the street and raised an alarm; and no one was injured. The estimated damage done by the fire to the house is said to be about Rs. 2,000. No reason can be adduced for the explosion except that perhaps a spark from the "biddee" of some passer-by may have fallen on them, setting fire to them.	...	...
18	17th Oct. 1903 .	Firework; mixture of chlorate of potash and sulphide of arsenic.	Angaryanathur, Madras Presidency.	A native was mixing and grinding chlorate of potash and sulphide of arsenic together for the purpose of making small bombs, when an explosion took place, injuring him so severely that he died from the effects a few days afterwards.	1	...
19	18th Oct. 1903 .	Fireworks, consisting of chlorate of potash, red sulphide of arsenic and stones.	Calcutta . .	A woman was carrying a quantity of bombs and crackers from one room to another in an earthen chatty. She accidentally let the chatty fall with the result that there was an explosion, which caused her severe injuries.	...	1
20	Ditto .	Fireworks, consisting of chlorate of potash and red sulphide of arsenic,	Calcutta . .	A native lad was filling a tin pipe with fireworks, when they suddenly exploded and caused him severe injuries.	...	1
21	19th Oct. 1903 .	Crackers, consisting of chlorate of potash.	Vizianagram .	While a man was manufacturing these crackers, they suddenly exploded, and the man was so injured that he died the next day. The cause of the accident could not be ascertained.	1	...

No	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			Explosives—*concld.*			
22	20th Oct. 1903 .	Fireworks .	Poona . .	Some fireworks were being let off near some huts which caught fire, and about a dozen of them were completely burned down.	...	...
23	20th Oct. 1903 .	Fireworks; explosive pellets consisting of sulphur, sulphate of antimony and nitrate of potash.	Poona . .	A native bought two annas worth of explosive pellets, and, finding that these did not make as much noise as he wanted when exploding, he, with two other natives, opened out the pellets, thirty-two in number, with a view to making one large pellet out of a couple of the small ones. Whilst doing this he let drop a pellet which exploded and set fire to the inflammable material which had been scattered about the room during the opening of the pellets. The three natives with another, who came to assist to put out the fire, all got injured by some of the pellets exploding.	...	4
24	23rd Oct. 1903 .	Fireworks, consisting of chlorate of potash and red arsenic (sulphide of arsenic).	Bombay . .	A native woman was manufacturing explosive pellets when an explosion took place, injuring her so severely that she died shortly afterwards, and slightly wounding an on-looker. The exact cause of accident was not ascertained, but as the mixture used for these pellets is very susceptible to explosion, either by friction, or a blow, or a fall, it was probably due to one of these causes.	1	1
25	October 1903 .	Fireworks .	Koraput, Vizagapatam.	A schoolmaster while grinding potassium and sulphur for preparing fireworks was injured by an explosion of the same.	...	1
26	1st Nov. 1903 .	Chinese crackers, consisting of saltpetre, sulphur and charcoal.	Bombay . .	A native went to a firework shop to buy Chinese crackers. He picked one up, and while stooping to pick up another, the cigarette he was smoking came in contact with the first cracker, exploding it, and he was badly burnt about the head.	...	1
27	5th Nov. 1903 .	Fireworks .	Bombay . .	An explosion took place in the shop of a firework dealer, setting the building on fire and doing considerable damage. It was caused by a person letting off a rocket, which fell into the shop, exploding the firework.	...	...
28	15th Nov. 1903 .	Fireworks; bombs consisting of chlorate of potash and sulphide of arsenic.	Sonarpur, 24-Perganas.	An explosion occurred when two native lads were preparing these bombs, injuring them both. They were using an iron tool.	...	2
29	23rd Nov. 1903 .	Fireworks .	Bombay . .	A fire broke out in a firework shop in Harris Road Works, and several other buildings were involved, causing a loss of about Rs. 4,000 worth of property. The cause of the fire could not be ascertained.	...	...
30	4th Dec. 1903 .	Firework mixture, consisting of chlorate of potash and red sulphide of arsenic.	Calcutta . .	A native lad was loading a brass toy cannon with a powder composed of chlorate of potash and sulphide of arsenic when the powder suddenly exploded and burst the cannon, causing him severe injuries.	...	1
31	4th Dec. 1903 .	Fireworks, consisting of sulphur and red arsenic, tied up in paper with a small pebble.	Bombay . .	The Commissioner of Police, Bombay, reports that a native while letting off fireworks was severely burnt. The fireworks were lying on the ground, and one, which he had in hand, fell amongst those of the ground and exploded the lot.	...	1
32	10th Dec. 1903 .	Box consisting of blue lights, fog signals, rockets, etc.	Bombay . .	The Commissioner of Police, Bombay, sent the following report:—The Government Surveyor condemned certain stores belonging to the British India Steam Navigation Co., consisting of blue lights, signals, rockets and distress rockets, in all about twenty in number, which were afterwards packed in a box for disposal. The Store-keeper of the Company sent these explosives out to sea in a prow for the purpose of having them thrown overboard into deep water. After proceeding some distance out, the crew decided to cast anchor. The box containing explosives was placed forward on the prow, the crew of which consisted of six men and a tindal. At the time the explosion occurred five of the crew were in the stern of the boat, and the tindal and the other man forward, where the explosives were placed. There is no reason why these men should have cast anchor before proceeding to deep water and throwing the explosives overboard. The fact of their anchoring leads one to believe that their intention was to appropriate the contents of the rockets to their own use. When the prow was taken charge of by the Police, about six rockets were found lying on the deck, which shows that the crew must have been handling the contents of the box. When leaving Bombay all the rockets were in the box. No trace of any exploded material could be found on board, and no damage was done to the prow, except, where the explosion is supposed to have taken place, a piece of the side, about eight inches square and a couple of inches deep, was blown away.	1	1
				TOTAL .	8	26

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			Petroleum.			
33	28th Feb. 1903 .	Kerosine .	Kosgi Railway Station Siding, Madras Railway.	A contractor's servant was trying to get into an empty oil tank wagon to see if there was any oil left that he might pilfer, while a boy held a light for him, with the result that there was an explosion, killing the man and severely injuring the boy.	1	1
34	16th Mar. 1903	Petroleum .	Tankshabin, Minbu District, Burma.	A fire broke out in a native refinery in the pits where the refuse petroleum, left after distillation, was stored. No particular damage seems to have been caused. It was believed that the fire originated through carelessness.	...	...
35	31st Mar. 1903	Kerosine .	Budge-Budge, Calcutta.	A fire broke out in Port Commissioners' shed No. 4 for the storage of oil in cases and tins and raged for a number of days. Luckily the shed was to the north of all the other sheds and of the bulk oil tanks and the breeze was southerly; otherwise the rest of the storage installation might have become involved. The cause of the fire could not be ascertained.	...	...
36	5th Apl. 1903 .	Kerosine .	Ramchandrapur, Coconada.	A marriage procession was proceeding along a street accompanied by men carrying kerosine oil torches. Fireworks also were being carried along and fired. A spark from the torches fell into a basket containing fireworks and gunpowder, and there was an explosion which frightened the torch-bearers who threw down their torches, and the lighted kerosine set the clothes of fifteen people on fire, burning them, so that seven of them died from their injuries.	7	8
37	18th May 1903 .	Kerosine oil .	Alamnagar Station	Oil was being emptied from a tank wagon after dusk, which is against rules, and caught fire probably through the coolies engaged in the operations bringing a light near. There was an explosion, which so seriously injured one man that he died from the effects.	1	...
38	21st May 1903 .	Kerosine .	Mirzapur Station, East Indian Railway.	An explosion occurred in an oil tank wagon containing oil belonging to Messrs. Shaw, Wallace and Co., which was being emptied. Their agent took a small naked lamp to the man-hole to see how much oil was left in and managed to drop it in the oil with the result that there was an explosion, and he and three coolies were seriously injured, and the agent and two of the coolies died next day. Work was being conducted after dusk which is against rules.	3	1
39	30th May 1903 .	Oil vapour .	Budge-Budge, in a tank boat belonging to Messrs. Shaw, Wallace & Co., of Calcutta.	Messrs. Shaw, Wallace and Co.'s Manager submitted the following report :—Shortly after my arrival at Budge-Budge last evening a fire was reported in tank boat No. 1. On going over I found an explosion had taken place (no fire), the gas having ignited from a spark, caused apparently while the flexible steel pipe was being hauled through the man-hole of the hatch. Mr. Street was supervising the filling of the boat, and explains that the friction caused by the spiral steel against the edge of the W. I. ring of the man-hole made the spark, and as there was no fire about to cause the accident, the explanation given is quite feasible. There has been no loss of oil. The boat is damaged, and the deck-plates are buckled, and the hull partly bulged above water mark. The accident, in my opinion, could not have been foreseen, and in future rubber hose will be used at the end of the main when loading boats.	...	...
40	24th Oct. 1903 .	Crude oil .	Singu, Burma .	Crude oil was being pumped on board a flat by the Burma Oil Company when flames suddenly broke out, spreading with great rapidity, and completely gutting the vessel so that her back was broken and she became a total wreck. Three natives got burnt and one died from his injuries. The actual cause of the fire could not be ascertained.	1	3
41	13th Nov. 1903.	Crude oil .	Yenangyaung, Burma.	The Sub-Divisional Officer, Yenangyaung, reports that an explosion occurred at boring No. 112 state well at 11-15 P.M., and that at 3 o'clock in the afternoon the oil sand was struck at a depth of 900 feet. As there was no tank, a hole was dug behind the derrick to keep the oil as it came out, and a durwan was kept in charge of it. Just before dark the durwan sent word to the Manager that the hole would be full at 11 P.M., and the latter replied that it should be allowed to overflow. Precisely at 11-15 P.M. the oil caught fire and exploded. The durwan was found lying in his hut not far away from the burning well, badly burnt. The cause of the explosion is not known, but it is highly probable and generally believed that the durwan sat down near the hole and struck a match to see if it was full, and the lighted match set fire to the flowing oil. The derrick and drilling implements were all destroyed.	...	1
				TOTAL .	13	14

No.	Date of accident.	Nature of chemical.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
				Chemicals.		
42	11th Apl. 1903 .	Phosphorous.	Bombay . .	A consignment of ordinary yellow phosphorous was being conveyed in a cart in the streets of Bombay. The phosphorous was packed under water in 10-lb. tins, two of which were enclosed in a wood case. One of the cases caught fire on the journey, and the cartman threw it off the cart on to the road, where the contents blazed away till extinguished by sand. The cause of ignition was believed to be due to the fact that the tins were leaky and consequently some of the phosphorous got uncovered by the water and combining with the oxygen of the air burst into flame, the ignition being accelerated by the friction due to transport.	...	...
43	16th Aug. 1903.	Ether . .	Benares . .	The District Magistrate of Benares reported as follows:— "The accident occurred in an ice factory at about 5 P.M. by an explosion of ether, and all the men who were working there, *viz.*, nine men, including the Manager, were severely burnt. They were promptly removed to the hospital, where, after lingering for a day or two, six of the nine died. The others recovered. "The explosion was caused by the use of naked lights while drawing up the condenser from the cooling tank. A leak was suspected in the condenser, and, after disconnecting it, it was being hauled up for examination. The workmen evidently thought there was no ether in it, but as they were drawing it up, a light was taken too close to it, causing an explosion which filled the building with an incandescent gas. Two years ago the Manager was warned that the condenser was worn and that the tubes needed renewal."	6	3
				TOTAL .	6	3

Summary of accidents during the year 1903.

Kind of explosive or dangerous and inflammable substance.	ACCIDENTS CAUSING LOSS OF LIFE AND BODILY INJURY.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons			
		Killed.	Injured.		
EXPLOSIVES.					
Gunpowder	5	9	1	...	5
Dynamite	7	5	18	...	7
Fireworks	16	8	26	4	20
TOTAL	28	22	45	4	32
PETROLEUM.					
Petroleum generally	6	13	14	3	9
TOTAL	6	13	14	3	9
CHEMICALS.					
Phosphorous	...	...	...	1	1
Ether	1	6	3	...	1
TOTAL	1	6	3	1	2
MISCELLANEOUS.	...	...	...	...	...
TOTAL	...	...	...	...	...
GRAND TOTAL	35	41	62	8	43

APPENDIX C.

Detailed Statement showing number of accidents and persons killed and injured during the four years, 1900 to 1903.

Year.	Gunpowder.			Dynamite and other nitro-compound blasting explosives.			Fireworks.		
	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.
1900 . .	5	22	5	3	...	4	8	4	9
1901 . .	9	8	10	7	3	14	12	12	18
1902 . .	10	8	8	2	1	4	25	22	40
1903 . .	5	9	1	7	5	18	20	3	26
Total .	29	47	4	19	9	40	65	46	93
Average .	7	12	6	5	2	10	16	11	23

Year.	Chemicals.			Petroleum.			Miscellaneous.		
	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.
1900 . .	6	1	11	3	14	...	...	...	...
1901 . .	4	1	1	6	21	3	...	...	...
1902 . .	5	2	2	3	7	1	2	4	...
1903 . .	2	6	3	9	13	14	...	...	...
Total .	17	10	17	21	55	18	2	4	...
Average .	4	2	4	5	14	4	...	1	...

APPENDIX D.

Comparative Statement showing number of accidents and persons killed and injured during the four years, 1900 to 1903.

Year.	ACCIDENTS CAUSING LOSS OF LIFE OR BODILY INJURY.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons			
		Killed.	Injured.		
1900	23	41	29	2	25
1901	32	45	46	6	38
1902	42	44	55	5	47
1903	35	41	62	8	43
Total	132	171	192	21	153
Average	33	42	48	5	38

APPENDIX E.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1903 to 31st December 1903.

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
Government Accidents.						
	26th June 1903 .	Gun-cotton .	Shishi Kut . .	At about 8 A.M., while a number of sappers were drilling blast holes on the Chitral Drosh Road, there was an explosion injuring four of them. A court of enquiry was held and decided that no blame was attachable to anyone. The sappers had been engaged in blasting work on this road up till the last week in May, when it was discontinued and operations were undertaken elsewhere. On the 25th June the sappers commenced work again on this same road, and on the 26th the accident occurred. It is believed that it was due to the residue of a charge, only partially detonated in the previous May, being exploded by the concussion caused by the jumpers used in drilling holes in its proximity. It is probable that a charge of wet gun-cotton, which was too wet to be entirely detonated by the dry primer, had by the temperature of the atmosphere become so dried by the 26th June as to be very senstive to any concussion. The old bore hole had become closed up by dust and general debris, so that it was not observed when fresh operations were commenced.	...	4

APPENDIX F.

Statement showing the import of explosives by sea into British India from other countries in the year 1903.

Quantity.	Imports in 1903.					
	Bengal.	Bombay.	Sind.	Madras.	Burma.	Total.
Gunpowder, black ... lbs.	66,420	92,049	38,129	68,575	7,250	2,72,423
Gunpowder, smokeless ... „	8,126	4,925	16,040	1,913	...	31,004
Dynamite ... ... „	2,02,496	60,000	1,14,000	...	39,984	4,16,480
Blasting Gelatine ... ... „	12,432	...	26,000	8,05,000	...	8,43,432
Gelignite or Gelatine Dynamite „	12,096	...	10,000	...	...	22,096
Other Nitro-compound Explosives „	1,75,280	46,824	...	...	...	2,22,104
Detonators ... ... No.	...	6,20,000	3,60,000	30,00,000	4,08,400	43,88,400
Fireworks ... ... lbs.	...	18,71,212	17,829	73,795	8,481½	19,71,317½
Total lbs.	4,76,850	20,75,010	2,21,998	9,49,283	55,715½	37,78,856½
Total No.	...	6,20,000	3,60,000	30,00,000	4,08,400	43,88,400
Value in Rupees.						
Gunpowder, black	55,778	43,030	9,627	24,913	8,520	1,41,868
Gunpowder, smokeless ...	23,387	18,528	22,135	4,188	...	68,238
Dynamite	1,77,464	48,526	93,521	...	32,000	3,51,511
Blasting Gelatine	14,938	...	24,982	7,56,146	...	7,96,066
Gelignite or Gelatine Dynamite	13,038	...	8,081	...	...	21,119
Other Nitro-compound Explosives	61,844	20,919	...	...	...	82,763
Detonators	16,164	9,318	7,565	57,585	5,025	95,657
Fireworks	13,683	3,91,487	9,798	41,080	6,176	4,62,224
Total Rs.	3,76,296	5,31,808	1,75,709	8,83,912	51,721	20,19,446

APPENDIX G.

Comparative statement showing the import of explosives by sea into British India from other countries during the three years, 1901, 1902, and 1903.

	1901.	1902.	1903.
Gunpowder, black ... ... lbs.	1,78,259	2,11,035	2,72,423
Gunpowder, smokeless ... „	17,379	26,605	31,004
Dynamite ... ... „	3,55,080	1,89,896	4,16,480
Blasting Gelatine ... ... „	6,10,000	7,25,000	8,43,432
Gelignite or Gelatine Dynamite „	61,950	50,000	22,096
Other Nitro-compound Explosives „	1,25,529	1,07,071	2,22,104
Detonators ... ... No.	26,79,000	32,97,509	43,88,400
Fireworks ... ... lbs.	8,33,268	11,47,223	19,71,317½
Total lbs.	21,81,465	24,56,830	37,78,856½
Total No.	26,79,000	32,97,509	43,88,400

Appendix H.

No. 2346.

GOVERNMENT OF INDIA.

HOME DEPARTMENT.

PUBLIC.

Simla, the 11th June 1903.

NOTIFICATION.

IN exercise of the power conferred by section 5 of the Indian Explosives Act, 1884 (IV of 1884), the Governor General in Council is pleased to make the following amendments in the rules to regulate the transport and importation of explosives published with the Notification of the Government of India in the Home Department, No. 5528, dated the 11th October, 1901 :—

I. For paragraph 2 of Rule 8, which runs as follows :—

" Provided that any explosive other than an explosive specified in rule 11 may, previous to the grant of an importation license, if certified to be of British manufacture or, if not of British manufacture, if imported from the United Kingdom and covered by the certificate granted by one of His Majesty's Inspectors of Explosives in England, be landed in accordance with such regulations as the Local Government may prescribe in this behalf, and be stored in a place set apart by the Local Government for this purpose. The Governor General in Council may extend this privilege to any such explosive not of British manufacture regarding which he is satisfied that it has been manufactured under adequate official supervision,"

the following paragraph shall be substituted, namely :—

" Provided that any explosive other than an explosive specified in rule 11 may, previous to the grant of an importation license, if certified to be of British manufacture or, if not of British manufacture, if imported from the United Kingdom and covered by the certificate granted by one of His Majesty's Inspectors of Explosives in England, be landed in accordance with such regulations as the Local Government may prescribe in this behalf, and be stored in a place set apart by the Local Government for this purpose, or in any of such private magazines as the said Government may have notified as being suitable for this purpose. Any such explosive of British manufacture may also be transported by rail to any of such private magazines previous to the grant of an importation license. The Governor General in Council may extend to any such explosive not of British manufacture regarding which he is satisfied that it has been manufactured under adequate official supervision the privilege of landing granted by this proviso, but such explosives may not be transported by rail until an importation license has been granted."

II. In rule 10, after the words "An explosive shall not be imported by sea except at one of the Ports of Calcutta" the words " (including Moyapur and Diamond Harbour) " shall be inserted.

III. In the second clause of rule 15, for the words "All explosives of which samples are taken for examination shall be forthwith deposited in a duly licensed place or places of storage, " the words "All explosives of which samples are taken for examination shall forthwith be deposited in a place or magazine set apart or notified under the proviso to rule 8," shall be substituted.

IV. At the end of condition 3 to License Form A attached to the rules the words "except in the case of explosives despatched to places or magazines set apart or notified under the proviso to rule 8," shall be added.

H. H. RISLEY,

Offg. Secretary to the Govt. of India.

Appendix J.

Draft.

I. For rule 19A the following shall be substituted, namely :—

"19A. (1) With the previous sanction of the Government of India, the Local Government may, in cases of urgency, and for any period not exceeding six months, grant a license for the possession of explosives under rule 17 in a floating magazine.

(2) Notwithstanding anything contained in rule 19, such license shall be in Form E E in the schedule hereto annexed, and shall be subject to the conditions and restrictions prescribed therein and to such further conditions and restrictions (if any) as the Local Government may in any case direct."

II. In rule 20, *after* the word and figures "rule 17" the words and figures "or rule 19A" shall be inserted.

III. In rule 32, *after* the words "granted or renewed" the words and figures "(except licenses granted under rule 19A)" shall be inserted.

IV. In the schedule, *after* Form E the following shall be inserted, namely :—

FORM E E.

(SEE RULE 19-A.)

Fee—*Twenty Rupees in Stamps.*

License to possess explosives in a Floating Magazine, granted by the Local Government.

Name of license-holder and residence.	Description of limits within which the magazine shall be moored or anchored.	Situation, character and construction of the magazine.	Description of explosive to be possessed.	Amount of explosive to be possessed at the same time in the magazine.	Date on which license expires.

DISTRICT ; } Seal. *Signature of*
190 . }

Conditions.

1. This license is given subject to the provisions of the Indian Explosives Act, 1884 (IV of 1884), and the rules thereunder.

2. The whole vessel, barge, or craft, in or on board which explosive is stored shall be deemed to constitute the magazine.

3. The magazine shall be used only for the keeping of such explosives as may be specified in the license, and receptacles for, or tools or implements for work connected with the keeping of such explosives.

4. The interior of the magazine, and the benches, shelves, and fittings therein, shall be so constructed or so lined or covered as to prevent the exposure of any iron or steel in such manner, and the detaching of any grit, iron, steel, or similar substance in such manner, as to come into contact with the explosive in such magazine, and such interior, benches, shelves, and fittings shall, so far as is reasonably practicable, be kept free from grit and otherwise clean.

5. The magazine shall have attached thereto a sufficient lightning conductor, which shall be tested previous to the storage of explosives.

6. Charcoal, whether ground or otherwise, and oiled cotton, oiled rags and oiled waste, and any article whatever liable to spontaneous ignition, shall not be taken into the magazine.

7. Before repairs are done to or in any part of such magazine, it shall, so far as practicable, be cleaned by the removal of all explosives, and by a thorough washing out. After being so cleaned it shall not be deemed a magazine until explosives are again taken into it.

8. There shall be constantly kept in the magazine affixed in such manner as to be easily read, a copy of the license, and of any special rules that may be issued from time to time for the keeping of explosives in a floating magazine.

9. All tools and implements used in any repairs to or in any part of the magazine, shall be made only of wood or copper or brass or some soft metal or material, or shall be covered with some safe and suitable material.

10. No fires, lights, lucifer matches, or any substance or article likely to cause explosion or fire shall be permitted to be at any time in the magazine.

11. Due provision shall be made by the use of suitable working clothes, without pockets, suitable shoes, searching and otherwise, or by some of such means for preventing the introduction into the magazine of fire, lucifer matches or any substance or article likely to cause explosion or fire, and for preventing the introduction of any iron, steel, or grit into any part of the magazine, where it would be likely to come into contact with explosive, and in any part of the magazine in which any explosive is kept which is liable to be dangerously affected by water, due precautions shall be taken to exclude water from such part; but this condition shall not prevent the introduction of an artificial light of such construction, position, or character, as not to cause any danger of fire or explosion: and so much of this condition as relates to the exclusion of iron, steel, or grit shall not be obligatory in the case of a magazine in which no explosives other than explosives of the 1st Division of the 6th (Ammunition) Class is kept.

12. No person shall smoke in any part of the magazine.

13. (1) The licensee shall not employ any vessel, barge or craft to carry an explosive to or from the magazine unless the cabin, hold or other part of the vessel, barge or craft in which the explosive is or is to be carried—

(*a*) is constructed without any exposed iron or steel in the interior thereof,
(*b*) contains only explosives, and
(*c*) is closed or otherwise properly covered over:

Provided that clause (*a*) shall not apply in the case of any vessel, barge or craft which carries no explosive other than explosives of the 1st Division of the 6th (Ammunition) class, or which is specially exempted by an order of the Chief Inspector of Explosives or by an order of the Local Government endorsed on this license.

(2) The licensee shall see that the explosives to be placed on any vessel, barge or craft so employed are loaded, carried and unloaded with all due diligence and with such precautions and in such manner as will sufficiently guard against any accidental ignition.

14. The licensee shall see—

(*a*) that no fire, unprotected light or smoking is allowed while any explosive [other than explosives of the 1st Division of the 6th (Ammunition) class] is being received or delivered, or while the hatches or door of the magazine, or the hatches or coverings of any vessel, barge or craft alongside containing any such explosive, are open, and

(*b*) that no receipt or delivery of explosives is carried on, and the hatches or door of the magazine are or is kept closed, when any vessel, barge or craft having on board a fire (other than engine-fires properly banked up) or an unprotected light is alongside a magazine containing an explosive of the 1st Division of the 6th (Ammunition) class, or in its immediate vicinity.

15. A person under the age of sixteen years shall not be employed in or enter the magazine, except in the presence and under the supervision of some grown up person.

16. In the case of the magazine being approachable at low water by carriages, the words "vessel, barge, or craft" shall in Nos. 12 and 13 of these conditions be taken to include carriage.

17. Two or more descriptions of explosives which may lawfully be possessed in a licensed magazine, may be possessed in the same magazine, if they are separated from each other by an intervening partition of such substance and character, or by such intervening space, as will effectually prevent explosion or fire in one compartment from extending to another compartment, subject to the following qualifications:—

(*a*) the various explosives of Classes 1 (Gunpowder), 2 (Nitrate-mixture), 3 (Nitro-compound), and 4 (Chlorate-mixture), safety fuze belonging to the 1st Division of Class 6 (Ammunition), and such of the various explosives of the 2nd Division of Class 6 (Ammunition), as do not contain any exposed iron or steel, may be kept with each other without any intervening partition or space,

(*b*) the various explosives of the 1st Division of Class 6 (Ammunition), may be kept with each other without any intervening partition or space,

(*c*) such of the various explosives of the 2nd Division of Class 6 (Ammunition) as contain any exposed iron or steel, may be kept with each other without any intervening partition or space,

(*d*) the various explosives of the 3rd Division of Class 6 (Ammunition), may be kept with each other without any intervening partition or space,

(*e*) the various explosives of class 7 (Firework), may be kept with each other without any intervening partition or space.

Save as aforesaid, two or more descriptions of explosive shall not be kept in the same magazine.

APPENDIX K.

No. 5100-S.R.

GOVERNMENT OF INDIA.

FINANCE AND COMMERCE DEPARTMENT.

STATISTICS AND COMMERCE.
Commerce and Trade.
Native Passenger Ships.

NOTIFICATION.

Simla, the 20th August 1903.

IN exercise of the powers conferred by section 53 of the Native Passenger Ships Act, 1887 (X of 1887), the Governor General in Council is pleased to make the following rules regarding the carriage of petroleum in ships to which the said Act applies :—

1. No petroleum which is dangerous within the meaning of the Indian Petroleum Act, 1899 (VIII of 1899), shall be shipped on board any ship proceeding or departing from British India, and no other petroleum shall be carried on board such a ship otherwise than in accordance with the following conditions, namely,—

(*a*) The master, owner or agent shall give notice to the Chief Customs-officer or such other officer as the Chief Customs-officer may nominate in this behalf, before permitting any petroleum to be shipped.

(*b*) Each consignment of petroleum shipped shall be covered by a declaration made and signed by the shipper in Form A (hereto annexed), if the petroleum has been imported into British India, and otherwise in Form B.

(*c*) Petroleum shall be shipped either in tins enclosed in outer wooden cases or in hermetically sealed iron or steel drums.

(*d*) The nature of every consignment of petroleum shipped shall be marked on the outside of the package containing it.

(*e*) Petroleum shall be stored separate from all other cargo and as far as possible away from lights or fires, and none shall be stored in any hold adjoining an engine or boiler.

(*f*) There shall be a water tight bulkhead between the engine room and any hold in which petroleum is stored, and the sluice-valves of such bulkhead shall be shut down and padlocked.

(*g*) Save where electric light is used, no petroleum shall be shipped or discharged except between sunrise and sunset; no lights other than electric lights shall be lit in a hold in which petroleum is stored; and no smoking shall be permitted in or near any such hold.

(*h*) No person shall otherwise than along with, or with the authority of, an officer of the ship, be permitted to visit a hold in which petroleum is stored.

(*i*) No more passengers shall be carried than can with safety be accommodated in the ship's boats in case of accident, unless the vessel is a coasting one proceeding on a short voyage and there are provided life-belts sufficient for such passengers as cannot be accommodated in the boats.

(*j*) At any port in which a ship carrying petroleum is for the time being the Chief Customs-officer, or such other officer as the Chief Customs-officer, may nominate in this behalf, may take and test any consignment of such petroleum or any single case or drum thereof.

(*k*) If any petroleum tested under clause (*j*) is found to be dangerous petroleum defined as aforesaid, the whole consignment of which the petroleum tested formed a part shall be liable to confiscation.

2. The officer authorised to grant a certificate in respect of a ship under sections 7 and 12 of the Native Passenger Ships Act, 1887 (X of 1887), shall, if there is petroleum on board, not grant the same without the consent of the Chief Customs-officer or such other officer as the Chief Customs-officer may nominate in this behalf.

3. Whoever commits a breach of any of these rules shall be punishable with fine which may extend to two hundred rupees, and, when the breach is a continuing one, with a further fine which may extend to twenty rupees for every day after the first during which the breach continues.

FORM A.

We hereby do declare that the cases and drums marked as follows :—

presented for shipment on the S. S. contain imported petroleum and that the petroleum is contained in the original packages, in which it was imported into this country.

Shippers.

Place
Date

FORM B.

We hereby declare that the whole of the petroleum contained in the cases of drums marked and presented for shipment on S. S. is petroleum which is covered by flash point certificate No. , dated , from the officer appointed by the Local Government for testing petroleum, a true copy of which, certified to by us, is herewith attached.

Shippers.

Place
Date

(Sd.) E. N. BAKER,
Offg. Secretary to the Government of India.

APPENDIX L.

MODEL SPECIFICATIONS OF TANKS FOR THE STORAGE OF PETROLEUM IN BULK AND SCREEN WALLS FOR SUCH TANKS.

GENERAL.

Any tank which satisfies the following conditions shall be deemed to be suitable for the storage of petroleum in bulk :—

(1) It must be constructed of good metal.

(2) It must be properly tested before use, and seen to be perfectly tight and staunch.

(3) It must at all times while in use be so well fitted that the inflammable liquid contained in it cannot escape thereform in the form of liquid, whether under the action of fire or otherwise.

(4) If it has a ventilating pipe, that pipe must be of suitable character and construction, and its orifice must be effectively protected by wire gauze.

(5) Every other opening in the tank, whether to be used as a manhole or for a pipe or other purpose, not being such a ventilating pipe as aforesaid, must have a neck whose length is at least equal to one-half of the diameter of the opening, and every such opening, when not in actual use, must be securely closed by an effective and properly secured cap, cover or tap.

(6) It must be further constructed as hereunder specified according as it is an underground or overground tank—that is to say :

I.—Underground Tanks.

A tank shall be deemed to be an underground tank which is wholly sunk in and surrounded by solid rock or earth, and the top of which is protected by a substantial covering of not less than nine inches of solid earth, sand or concrete. There must be no opening in such top or covering, other than such manholes, pipes, pumps, or other connections as may be necessary.

Every underground tank must be constructed of strong iron or steel tank-plates well riveted together and thoroughly caulked. The tops and sides must be supported and strengthened by such uprights, girders, angle-irons and ties as, having regard to the capacity and situation of the tank, may be necessary to render the tank thoroughly substantial and effective.

The underground space in which the tank is enclosed must be of such construction and character that mineral oil cannot escape thereform in the form of liquid, whether under the action of fire or otherwise, so as to reach either directly or indirectly any other place where inflammable liquid is kept, or any protected work,* or any river, sewer, stream or drain.

II.—Overground Tanks.

Every tank shall be deemed to be an overground tank which in respect of situation does not satisfy the conditions hereinbefore specified for an underground tank.

If the tank is to be placed or fixed elsewhere in a building than on the basement, its position must be approved by the local authority.

(*a*) Every tank of a capacity not exceeding 60 gallons must be well constructed of galvanized iron of such strength, having regard to its size, and with seams so securely closed and fastened, as to form an effective receptacle for the inflammable liquid which it contains.

* Protected works are buildings in which persons dwell or assemble, docks, wharves, timberyards, other petroleum stores and any other place which the local authority may declare as such.

(*b*) Every tank of a capacity exceeding 60 but not exceeding 1,000 gallons must be constructed of good galvanized iron plates of such thickness, and with rivets of such size and at such distances apart (measured from centre to centre) as appear in the following scale:—

For tanks of a capacity not exceeding	Thickness of plates not less than	Size of rivets not less than.	Distance of rivets apart not more than.
100 gallons	$\frac{1}{16}$ inch	$\frac{1}{4}$ inch	$\frac{3}{4}$ inch.
250 „	$\frac{1}{8}$ „	$\frac{3}{8}$ „	$1\frac{1}{8}$ „
500 „	$\frac{1}{8}$ „	$\frac{3}{8}$ „	$1\frac{1}{8}$ „
1,000 „	$\frac{3}{16}$ inch if cylindrical $\frac{1}{4}$ inch of any other shape	$\frac{7}{16}$ „	$1\frac{1}{4}$ „

If the tank has a capacity exceeding 60 but not exceeding 250 gallons, it must rest on the ground, or on brick or stone piers, or must be securely and adequately supported on strong girders.

If the tank has a capacity exceeding 250 but not exceeding 1,000 gallons, it must be properly stiffened with vertical angle-irons and cross-stays, and must rest on solid foundations of concrete, brick or stone.

(*c*) Every tank of a capacity exceeding 1,000 gallons must be cylindrical in shape, and must not exceed 26 feet in height or 35 feet in diameter. The top of the tank must be constructed of plates of a thickness of $\frac{1}{8}$ inch, riveted with $\frac{3}{8}$ inch rivets not more than $1\frac{1}{8}$ inch apart, and supported by a sufficient number of strong and efficient angle-irons and ties, and where necessary by king posts.

The sides and bottom of the tank must be of best iron or steel tank-plates of at least the following thickness:—

Namely, within 10 feet from the top of the tank . . $\frac{1}{4}$ inch thick.
„ over 10 and within 20 feet from the top of the tank . . . . . $\frac{5}{16}$ „
„ over 20 feet from the top of the tank . . . $\frac{3}{8}$ „
„ bottom of tank . . . . . $\frac{1}{4}$ „

The plates must be riveted by $\frac{3}{8}$ inch best rivets driven hot, and not more than $1\frac{7}{8}$ inch apart, measured from centre to centre, and all vertical seams must be double riveted.

Every such tank must be erected on good solid foundations, upon which the entire bottom surface shall have a fair bearing, and must be strengthened throughout by a sufficient number of strong and efficient angle-irons and cross-stays.

If the tank has a capacity of more than 15,000 gallons, it must be constructed as hereinbefore described, and further, must be separately surrounded by a wall of such dimensions and substantial construction, or must be partially sunk in an excavation in such a manner that the total quantity of mineral oil capable of being contained in the tank could be altogether contained in the enclosure formed by such wall or excavation, and could not escape therefrom in the form of liquid whether under the action of fire or otherwise; and the space formed by such wall or excavation, so far as not occupied by the tank, must be kept entirely free and unoccupied.

Specification of screen wall.

A screen wall must be substantially constructed of good hard bricks, or such good building stone, not being lime stone, or such concrete as may be approved by the local authority, properly bonded and solidity put together with good mortar or cement, on proper footings and foundations.

creen wall must be of a thickness of not less than as follows:—

Within 16 feet of the top of the wall	13 inches
Over 16 feet and within 32 feet of the top of the wall . .	17½ „
„ 32 „ „ „ 48 „ „ „ „ „ „ „ . .	22 „

and in like proportion for any greater height.

A screen wall must be strengthened by two or more transverse buttresses of similar construction to the wall. The buttresses must be carried up to the top of the wall and properly bonded thereto, and must not be more than 20 feet distant from each other. Each buttress must, at its base, project from each side of the wall not less than one-eighth the height of the wall, and at its top not less than nine inches. There must be no window, door, or other opening in a screen wall other than such fireproof doors as are necessary for the purposes of access to the premises, and are open only when required for the said purposes.

Scale of maximum amounts of petroleum allowed to be kept according to distance from protected works.

Distance of depôt from protected work.	Number of gallons allowed to be kept.		
	Not wholly in tank depôts.	In tank depôts but not wholly underground.	Wholly in underground tank depôts.
Within 10 feet	100	250	500
Over 10 feet and not exceeding 20 feet .	500	1,500	5,000
„ 20 „ „ „ „ 30 „ .	2,000	6,000	20,000
„ 30 „ „ „ „ 50 „ .	5,000	15,000	50,000
„ 50 „ „ „ „ 75 „ .	10,000	50,000	Unlimited.
„ 75 „ „ „ „ 100 „ .	15,000	150,000	
„ 100 „ „ „ „ 150 „ .	20,000	Unlimited.	
„ 150	Unlimited.		

APPENDIX M.

General notes on the construction and management of small Petroleum Installations or tank depôts to assist District Officers in granting licenses for new installations.

1. The tank installation or depôt should be surrounded with a brick wall or moat or a combination of both in such a way that it will efficiently contain and prevent the overflow of all the oil, in case of its escape, that may be stored at any one time in the tanks, filling, soldering and storing sheds, and a certificate to this effect should be obtained before a license is granted.

2. A pipe must necessarily lead from the tank or tanks to the filling room, but no soldering should be allowed in the filling room. The soldering should take place in a separate room or building placed as far from the tanks as can be conveniently arranged, and no more tins should be allowed in the soldering room at one time than are absolutely necessary for expeditious working.

3. The depôts should only be open, and work permitted, between sunrise and sunset.

4. No smoking should be allowed or any fires or lights permitted except those necessary in the soldering room and watchman's house.

5. No goods of a combustible nature should be kept inside the depôt.

6. All operations should be conducted under the charge of a qualified and responsible agent or supervisor.

7. Where an installation is provided with a lightning conductor, it should be tested at least once a year, and a certificate showing the date of the last test hung up inside the installation.

8. Where there are any pipes or openings in the enclosure wall for draining out water, arrangements should be made whereby they can be closed and only kept open when actually necessary for draining purposes.

9. The godown for the storage of tins should not have any inflammable material in its construction, and if it is not situated within the enclosure wall of the installation, its floor should be so sunk or it should be surrounded with a wall so that all the oil stored in the godown can be contained in the sunk floor or within the wall if it should escape from the tins. A combination of sunk floor and a wall is permissible; in this case the wall would not have to be so high.

10. A few baskets of sand should always be kept in the filling or soldering shed, as sand is very useful for extinguishing purposes at the commencement of a fire, where only a small quantity of oil is involved.

11. The ground in the interior of the installation should be kept scrupulously clean and free from vegetation, rubbish, etc.

12. A copy of these notes in English and the vernacular, together with a copy of the conditions of the license and a statement showing the maximum quantity of tins to be allowed in the soldering room at one time, should be hung up in the installation.

C. A. MUSPRATT-WILLIAMS,
Major, R. A.,
Chief Inspector of Explosives in India.

Appendix N.

CIRCULAR NO. I—RAILWAY.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

RAILWAY TRAFFIC.

To

THE SECRETARIES TO THE GOVERNMENTS OF
MADRAS, BOMBAY, AND BURMA,
PUBLIC WORKS DEPARTMENT, RAILWAY BRANCH.

THE SECRETARY TO THE GOVERNMENT OF BENGAL,
PUBLIC WORKS DEPARTMENT.

THE SECRETARY TO THE GOVERNMENT OF BENGAL,
MARINE DEPARTMENT.

THE HONOURABLE THE CHIEF COMMISSIONER OF
ASSAM.

THE HONOURABLE THE RESIDENT AT
HYDERABAD.

THE HONOURABLE THE AGENT TO THE GOVERNOR GENERAL
FOR RAJPUTANA.

THE CONSULTING ENGINEER TO THE GOVERNMENT OF
INDIA FOR RAILWAYS, CALCUTTA, LUCKNOW, AND
ASSAM.

THE MANAGERS, NORTH-WESTERN, OUDH AND ROHILKHAND,
AND EASTERN BENGAL (STATE) RAILWAYS.

Precautions to be taken in accepting Petrol or Motor Spirit, Naptha, Benzoline, Gasoline, Benzine, and other dangerous petroleum when tendered for carriage by railway.

Simla, the 24th June 1903.

SIR,

I am directed to state that the Government of India are pleased to rule that petrol or motor spirit, naptha, benzoline, gasoline, benzine, and other dangerous petroleum coming under class D of dangerous goods may be accepted for carriage by railway under the following conditions :—

(*i*) That they are contained in gas-tight iron or steel drums of at least $\frac{1}{8}$th inch thickness, containing not more than 10 gallons, and fitted with well made filling holes and well fitting screw plugs, or in gas-tight tinned sheet iron drums, containing not more than 10 gallons, fitted with screw cap with metal air-tight under-cap or fitted with well fitting screw plugs. These latter drums to be packed in strong wooden cases, the thickness of the wood to be not less than $\frac{1}{2}$ inch.

(*ii*) That the drums shall be so substantially constructed and secured as not to be liable, except under circumstances of gross negligence or extraordinary accident to be broken or become defective, leaky or insecure in transit.

(*iii*) That the nature of the contents and also the words "Highly inflammable" must be distinctly marked on the vessels.

(*iv*) That a certificate is handed in by the consignor to the effect that an air space of at least $\frac{1}{10}$th its capacity was left in each drum at time of filling.

2. (*i*) The vehicles carrying the dangerous petroleum must be well ventilated, and no lamps or naked lights should be allowed in, or brought near these vehicles while so loaded. The chief danger to be apprehended is from leakage, as the vapour of these petroleums is heavier than air and is inflammable, and if mixed with certain proportions of air in a confined space, is explosive.

(*ii*) The drums containing these petroleums must never be allowed to stand in the sun.

(*iii*) Damaged drum should not be accepted and empty drums should not be carried unless the screw plugs or screw caps are securely fitted, as there is always vapour left in a drum even when it has been emptied.

I have the honour to be,

SIR,

Your most obedient Servant,

A. R. JACOBSON,
Offg. Under Secy. to the Govt. of India.

Indian Explosives Act (IV of 1884).

SIXTH ANNUAL REPORT

OF THE

CHIEF INSPECTOR OF EXPLOSIVES IN INDIA,

BEING HIS

Annual Report for the Year ending 31st March 1905.

CALCUTTA:
OFFICE OF THE SUPERINTENDENT OF GOVERNMENT PRINTING, INDIA,
1905.

Sixth Annual Report of the Chief Inspector of Explosives, India.

No. 759.

FROM

MAJOR C. A. MUSPRATT-WILLIAMS, R.A.,

Chief Inspector of Explosives,

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,

DEPARTMENT OF COMMERCE AND INDUSTRY.

Simla, the 15th July 1905.

SIR,

Introductory.

I HAVE the honour to submit herewith a report of the work of my Department for the year ending 31st March 1905.

Personnel.

2. Captain F. G. Smallwood, R.A., was in charge of the Department from 1st April to 6th November 1904, while I was on leave.

Number of Magazines.

3. During the year 1904, 105 licenses (four more than in the previous year) were granted in British India under Rule 17 of the Rules to regulate the manufacture, possession and sale of explosives. The number of magazines licensed was 150, four more than in 1903, and is in excess of the number of licenses granted, because in a number of cases firms have two or more magazines under one license. A statement showing the number and location of the magazines, and also the number of licenses granted in British India is given in Appendix A. It will be seen from this statement how widely dispersed these magazines are, and consequently how much time is spent in getting from place to place, which necessarily to a certain extent curtails the number of inspections that can be made during the year.

Inspection of explosives during the year.

4. During the year 270 inspections of magazines were made, a number of the magazines being inspected two or three times each. Those magazines are inspected most frequently which are situated in the neighbourhood of towns or in populous localities, or which contain large quantities of explosives or any explosive, which on account of greater susceptibility to decomposition it is considered advisable to examine and test more often than other explosives. The Roburite Factory at Karachi was inspected twice. In addition to these inspections, a number of registered premises were visited.

Condition of Magazines.

5. The magazines generally are in good order, and I have found magazine owners most willing to carry out my recommendations, even when involving considerable expense, and my thanks are due to them for making my duties easy in this respect.

Condition of explosives in magazines.

6. The physical condition of all the explosives in the different magazines during the year was found to be good, and none of the samples taken at inspections failed to pass the tests laid down, which were carried out as usual, by the Chemical Examiners at Calcutta, Bombay, Madras and Rangoon, and also by the testing officer at Karachi.

Thefts.

7. During the year five cases of theft of explosives from magazines in the coal districts in Bengal were reported to this office. I have been given to understand that the dynamite and detonators thus obtained are very often disposed of to the owners of petty mines, who have no magazine license, and who are only too glad to be able to get these explosives at a less than market price, thereby creating a demand and encouraging robbery. The fact of the magazines being strongly built does not appear to prevent their being broken into, and I am afraid these robberies are always likely to occur where reliable chowkidars, such as old pensioned sepoys, are not employed to guard the magazine. In some cases no chowkidars are employed at all.

Inspection of petroleum installations during the year.

8. During the year under report the Government of India addressed all the local Governments, enlarging the functions of the Chief Inspector of Explosives, and constituting him expert adviser in petroleum matters, not only to the Government of India but also to all local Governments and Administrations. The Government of India also considered it advisable that this officer should during his tours make visits of inspection to bulk oil installations and to other places where petroleum was stored or used, in order that he might be in a position to observe for himself at first hand the working of the regulations and to draw attention to any points which might require remedying. The necessary alterations in the Provincial Petroleum Rules, giving him and the Inspector of Explosives powers to inspect, are now being introduced. In consequence of the above orders, I personally visited the large bulk oil installations at Madras, Bombay, Karachi, Calcutta (Budge Budge and Narculdanga), Chittagong and Rangoon, and also the oil fields and oil refineries in Assam and Burma. In addition to these, 60 inspections of small bulk oil installations, such as are usually situated near railway stations, were made by the Inspector of Explosives and myself.

Condition of large installations.

9. The large installations are usually under European supervision, and are, on the whole, fairly well looked after, although in the older installations the tanks are very much closer to each other and to other buildings than would be now allowed. At Budge Budge, where there is ground available allowing for extension, steps have already been taken to get rid of existing defects and risks. This was referred to in page 4 of my 5th Annual Report.

New large Bulk Oil installations.

10. The Burmah Oil Company under the supervision of the Port Trust, Bombay, have just erected a bulk oil installation at Chinkpugli, which is as safe as it is possible for human precautions to make it, and has the appearance of a fortress. The Standard Oil Company and Burmah Oil Company are also just about to erect installations at Karachi, for which the designs and plans have been submitted to me. In Madras the Burmah Oil Company have submitted proposals for an oil installation on the sandy accretion to the south of the Madras Harbour, which has been allotted to them by the Port Trust authorities. From this it will be seen how fast the Petroleum Industry is expanding.

Condition of small Bulk Oil stations.

11. The small installations are situated mostly near Railway stations, and are generally looked after by native agents, employed by the large oil firms. I regret to say that a number of these installations are in a very undesirable, and, in fact, I may say dangerous condition. For instance these installations have enclosure walls round them to contain all the oil stored within them in case of its escape, possibly in a burning state, from the tanks or their receptacles.

These walls have very often had holes knocked in them for draining purposes, so that they have been rendered absolutely useless as safeguards. In other cases, the enclosure intended for the retention of oil in case of its escape has been filled up with empty drums and other rubbish, and there have also been other serious defects noticed. Presumably some inspection of these installations has been made by local officials, but evidently from want of technical knowledge such inspections have not been of much use, and the installations appear to have been licensed from year to year in a defective state. I have addressed a circular letter to all the local Governments and to all the oil firms pointing out the very great danger of holes in a containing wall, and recommending that, where drainage was necessary, an iron pipe with valve should be fitted and only kept open when actually required for use. Reports also have been submitted to District Magistrates after each inspection of these small installations, pointing out the defects to be corrected. I believe there are about 300 of these small installations scattered about the length and breadth of British India, and they are increasing in number daily. Although I consider that regular expert inspection of these installations is imperative, at the same time I am afraid it is a practical impossibility for me to arrange for the inspection of more than a comparative small number of them yearly.

Accidents.

12. No accidents have occurred in the magazines or in the one factory (Roburite Factory) licensed in this country. A list of other accidents by fire or explosion that have occurred with explosives, inflammable substances, dangerous chemicals, etc., between the 1st January 1904 and the 31st December 1904, and that have been brought to the notice of this Department, is given in Appendix B, and gives a short account of each one. It will be seen from the perusal of the details that the accidents have mostly taken place owing to gross carelessness or through other neglect of ordinary precautions. In all there were forty-seven accidents causing eighty deaths and injuries to seventy people. The death rate is considerably higher than it has been in previous years, but this is due to a bad petroleum fire on board an Irrawaddy Flotilla Steamer, the "Yomah," in trying to escape from which a number of persons were drowned. Comparative statements given in Appendices C and D show the total number of accidents, and of persons killed and injured during the five years 1900 to 1904.

Gunpowder.

13. There were eleven gunpowder accidents during the year, causing the deaths of twenty-five persons and injuries to thirty. One accident alone (Index No. 10) was responsible for sixteen killed and sixteen injured, and as an example of recklessness, cannot well be surpassed.

Dynamite.

14. Dynamite (five accidents) were responsible for three deaths and injuries to ten persons.

Fireworks.

15. Thirteen accidents from fireworks have been reported to this Department, causing ten deaths and injuries to nine persons. Most of the accidents are caused by the Sulphur Chlorate combination of fireworks, which are prohibited in England, but which the Government of India, after due consideration of all the points at issue, decided not to prohibit in India.

Petroleum.

16. There were eight accidents from petroleum reported during the year which were responsible for forty-two deaths and injuries to ten people. One very regrettable accident, already referred to in this report, was responsible for thirty-one of these deaths, and was due to a neglect of rules in the shipment of crude oil in wood barrels, which allowed the oil to leak and get ignited. Another accident, which is always reoccurring, was due to a man taking a lamp to look into a tank, from which oil had been discharged, to see how much was left.

Import of Explosives.

17. Four million seventeen thousand and two hundred pounds of explosives, or roughly about two thousand and eight tons, were imported by sea into British India during the

year 1904, the value being Rs. 20,28,193. This shows an increase of one hundred and nineteen tons over the imports of 1903, and the import of explosives has increased by 911 tons since 1901, *vide* Appendix F. These figures show how the trade in explosives is increasing year by year. Full details, showing the different kinds of explosive imported during the year and the value of each, are given in Appendix E.

Petroleum Industry.

18. The Petroleum Industry in India has developed most rapidly in the last few years, which is shown by the fact that the output or production of crude petroleum in British India rose from 19,000,000 gallons in 1897 to 88,000,000 gallons in 1903. The imports of American and Russian oil have lately decreased, but there has been a considerable increase in the imports of Borneo Oil. I am indebted to the "Review of the Trade of India" in 1903-1904, published by the Director General of Statistics, for the information that the total value of the trade in Mineral Oil was 338½ lakhs, of which nearly 301 lakhs represented the value of Kerosene.

Petroleum Rules.

19. The present petroleum rules are somewhat antiquated and unsuited to present day requirements, and do not lay down clearly the conditions under which bulk oil installations should be licensed. Moreover the rules differ in each province instead of being uniform. The Government of India will be shortly issuing to local Governments for criticism a uniform set of rules for each province, which will remedy all these defects. It is unfortunate that the Indian Petroleum Act will not allow of one set of consolidated rules being issued by the Government of India for the whole of India, but it is intended that the future provincial rules shall be kept similar with the exception that provisos for local conditions may be introduced, where absolutely imperative.

20. Draft instructions, however, for the possession of dangerous petroleum have been issued to local Governments in advance of the above rules. These are given in Appendix G. These rules are based on recommendations I have made after a number of informal conferences with representatives of the oil trade, and should give considerable relief to those interested in the petrol trade, who find the present rules too restrictive. I believe also that at the recomendation of the Government of India considerable relaxation will shortly be made by the local Governments in the rules for the transport of dangerous petroleum and also that the fees for possession and transport will be considerably reduced.

Carbide of Calcium Rules.

21. Carbide of Calcium comes under the Indian Petroleum Act, and consequently each province has to have its own set of rules. The final issue of these rules has been delayed owing to new concessions having been allowed in England, which it is proposed to adopt in the Indian Rules, such as the possession of 28 lbs. of carbide of calcium without a license under certain conditions, and also the raising of the quantity that may be allowed to be packed in any one drum to 224 lbs.

Store house for the possession of petrol by motorists.

22. As enquiries have constantly been addressed to this Department as to the kind of store house, which would be suitable and safe for the storage of petrol by motorists, I circulated to local Governments a plan of such a store house together with notes on its construction. These are given in Appendices H and I.

Rules for the manufacture, possession and sale of explosives.

23. One Consolidated Set of Rules for the whole of India for the manufacture, possession and sale of explosives has now been published for criticism. These rules have been rearranged, and are in simpler form than the old rules. The rules for registered premises have been made similar to those in vogue in England, which are less restrictive than those that have been in force in India up to date. A number of complaints on this subject had been made by firms interested.

Rules for the transport and importation of explosives.

24. New and simpler rules for the packing of explosives for conveyance were issued lately in England and draft amendments embodying similar changes in India have been published by the Government of India for criticism together with a list of "Authorised Explosives" prepared by this Department and published in the same Gazette. This list is given in Appendix J and will be published annually in the Gazette of India and in this Department's Annual Report.

Extension of Bombay Docks and proximity to oil installations.

25. In my Annual Report for 1904, I discussed the question of the extension of the Bombay Docks, which would bring them in close proximity to the bulk oil installations at Mody Bay, and recorded my opinion that this was undesirable. I am glad to say that the Port Trust, Bombay, have now decided to remove these installations in due course to another site near Sewri.

Acetylene.

26. As there is now considerable lighting by Acetylene gas in this country, I have thought it advisable to draw attention to three precautions, which all those who have anything to do with Acetylene installations should strictly observe :—

1. Never bring a light into the building or near to any part of an acetylene apparatus which is being cleaned out.
2. Never attempt to repair with soldering iron or flame any vessel that has held acetylene until it has been filled with water.
3. Never enter the building or approach any vessel with a lighted pipe, cigarette or cigar.

It should always be remembered that acetylene has a wider range of explosive proportions with air than other gases, and also is practically of the same weight as atmospheric air, so that it will not move of its own accord out of a receptacle, but requires to be forced out.

Rules for the destruction of dynamite and similar explosives, and also detonators.

27. As I am constantly being asked for information as to how to destroy dynamite and detonators, I have drawn up some instructions which are given in Appendix K.

I have the honour to be,

SIR,

Your most obedient Servant,

C. A. MUSPRATT-WILLIAMS, *Major, R.A.*,

Chief Inspector of Explosives.

APPENDIX A.

List of Magazines and Licenses granted under Rule 17 of the Explosives Rules for the year 1904.

Province or Presidency.	District.	Magazines.			Licenses.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Assam	Cachar	1	...	1	1	...	1
	Lakhimpur	1	...	1	1	...	1
	Total	2	...	2	2	...	2
Bengal	Burdwan	19	...	19	16	...	16
	Darjeeling	3	...	3	3	...	3
	Gaya	7	...	7	5	...	5
	Hazaribagh	12	2	14	10	2	12
	Hooghly	4	...	4	1	...	1
	Manbhum	16	...	16	13	...	13
	Total	61	2	63	48	2	50
Bombay†	Bombay	12	3	15	7	2	9
	Karachi*	8	...	8	4	...	4
	Total	20	3	23	11	2	13
Burma	Mergui	1	...	1	1	...	1
	Ruby Mines	1	...	1	1	...	1
	Syriam	2	...	2	1	...	1
	Total	4	...	4	3	...	3
Central Provinces	Bilaspur	1	...	1	1	...	1
	Chindwara	1	...	1	1	...	1
	Jubbulpur	2	1	3	1	1	2
	Nagpur	...	3	3	...	2	2
	Raipur	4	...	4	4	...	4
	Saugor	1	...	1	1	...	1
	Seoni		...	1	1	...	1
	Total	10	4	14	9	3	12
Madras	Coimbatore	1	1	2	1	1	2
	Godaveri	5	...	5	2	...	2
	Madras	17	...	17	5	...	5
	Nellore	4	...	4	2	...	2
	The Nilgiris	3	2	5	2	1	3
	Vizagapatam	4	...	4	2	...	2
	Total	34	3	37	14	2	16
United Provinces	Cawnpur	2	...	2	2	...	2
	Dehra Dun	1	...	1	1	...	1
	Garhwal	1	...	1	1	...	1
	Lucknow	1	...	1	1	...	1
	Meerut	1	...	1	3	...	3
	Shahjehanpur	1	...	1	1	...	1
	Total	7	...	7	9	...	9
SUMMARY.							
Assam		2	...	2	2	...	2
Bengal		61	2	63	48	2	50
Bombay		20	3	23	11	2	13
Burma		4	...	4	3	...	3
Central Provinces		10	4	14	9	3	12
Madras		34	3	37	14	2	16
United Provinces		7	...	7	9	...	9
	Grand Total	138	12	150	96	9	105

* At Karachi there is in addition a Roburite Factory licensed under Rule 12.
† At Ahmedabad a temporary license was granted for 6 months under Rule 19 A.

APPENDIX B.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1904 to 31st December 1904.

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons.	
					Killed.	Injured.
			Explosives.			
1	19th Jan. 1904.	Gunpowder	Madras	A European employé of Messrs. Oakes & Co. had extracted about 20 lbs. of damaged gunpowder from old cartridges. While it was being conveyed on a trolly past a blacksmith's workshop to a neighbouring well to be destroyed by drowning, he flung a little on the blacksmith's fire to see if it was in a sufficiently good condition to blaze up, with the result that the main mass of the powder got ignited by a spark and exploded. He and two native employés were injured by the explosion.	...	3
2	21st Feb. 1904.	Gunpowder	Cuddalore	During the celebration of a festival at a village temple, three boys who had been watching the firing of shots, climbed over the wall of the temple after the priest and others had left and brought out a pot containing a small quantity of gunpowder and an iron tube. They filled the tube with the powder and set fire to it, with the result that there was an explosion causing fatal injuries to two of them.	2	...
3	22nd Feb. 1904.	Black powder	Gaya-Khatras Ry.	During blasting operations one charge misfired, and the next day, while further bore holes were being made the unfired charge exploded, due evidently to a bore hole being made too close to the unfired one.	1	3
4	18th April 1904.	Gunpowder	Tinnevelly	During the process of pounding the ingredients for the manufacture of country gunpowder, an explosion occurred whereby two people were killed and one injured. The mortars used for mixing were of stone.	2	1
5	2nd May 1904.	Gunpowder	Tindivanam, South Arcot.	The Magistrate reported that a native had obtained about 4 lbs. of gunpowder for the purpose of firing shots during a festival. He opened the paper packet of powder and put the powder into a mud pan, and while doing so he dropped a small quantity on to the floor. Instead of collecting what had been spilled, he set fire to it with a wick taken from a lamp burning close by. The powder in the pan also immediately ignited and severely injured the man who subsequently died; another native who came to his rescue sustained injuries from the fire.	1	1
6	14th May 1904.	Gunpowder	Gaya-Khatras Ry.	While blasting, the skull of a man was fractured by a rock falling on him.	...	1
7	August 1904	Gunpowder	Kishingi	A party of Pathan coolies who had been employed on some blasting work, had stolen some gunpowder and buried it in the courtyard of a serai. They were unable to dispose of it, so left it concealed. A sweeper not knowing that the powder was there lit a fire, when the powder exploded causing slight injuries to the man.	...	1
8	7th Oct. 1904	Gunpowder	Baragur, Salem	The Magistrate reported that two natives were firing small quantities of gunpowder at short intervals. The powder was rammed into iron tubes attached to a log of wood in the ground and then set fire to. Some powder which was kept close by their side caught fire and exploded, killing one man and injuring another.	1	1
9	6th Nov. 1904	Gunpowder	Marudadu, Cuddalore.	The Magistrate, South Arcot, reported that while a native was loading a bamboo tube with gunpowder an explosion due to friction occurred, whereby the man was injured in his left hand, and another native who was standing near by received injuries to his face.	...	2
10	7th Nov. 1904	Gunpowder	Patwas	The Magistrate of Gaya reported that a dancing party was being held in the verandah adjoining a room in which a large quantity of gunpowder had been stored. Cigarettes and tobacco chillums were freely passing round among relatives and friends invited and the smouldering cigarettes and chillums were recklessly thrown into the room where the gunpowder was stored with the result that an explosion occurred and 32 men were injured of whom 16 died.	16	16
11	24th Dec. 1904.	Gunpowder	Nushki Ghat, Quetta-Nushki Ry.	The Sub-Divisional Officer, Quetta-Nushki Railway, reported that three coolies were mixing country and English powder when the powder ignited probably because an iron shovel was used. Two men were killed and the third injured.	2	1
				TOTAL	25	30

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons. Killed.	Injured.
				Explosives—*contd.*		
12	22nd Feb. 1904.	Dynamite .	No. 1 Tunnel near mile 30 of the Gaya-Khatras Railway.	During blasting operations one charge misfired, and in drilling the next round of holes, a drill struck the unexploded charge, which exploded, killing one man and injuring three others.	1	3
13	27th Feb. 1904.	Dynamite .	Madras . .	A quantity of wetted dynamite was being destroyed. The Commissioner of Police reported that the empty cases and wrappers, etc., were put apart to be burnt separately from the dynamite. A European Inspector in the presence of the Deputy Commissioner of Police set fire to the pile and was standing aside, about 20 paces off, when there was a loud explosion and the cases, etc., were blown to atoms. The Inspector appears to have been injured as well as two coolies.	...	3
14	2nd May 1904 .	Dynamite .	Nishpa Tunnel .	While drilling holes for blasting, an unexploded charge which was evidently not observed, exploded, killing one man and severely injuring another.	1	1
15	19th June 1904.	Dynamite .	Chutterpore, Hazaribagh.	An explosion of dynamite occurred in the house of a Babu, an employé of the Dickson Irwin (Koderma) Mica Mining Syndicate, whereby he was killed. It appears that he used to keep some dynamite in his house. No absolute cause could be assigned for the accident.	1	...
16	Nov. 1904 .	Dynamite .	Patwas . .	The Magistrate of Gaya reported that during blasting operations an exploded charge was struck by a drill in making a fresh hole near a previous charge. It appears that a hole already drilled was cleaned out for about 4 inches, the hole was tightly packed and seeing no fuse in it, a new hole was made near it and while drilling this one the explosion occurred injuring three persons.	...	3
				Total .	3	10
17	30th Mar. 1904.	Cartridge .	Calcutta . .	A sweeper was beating out the brass of a cartridge which he obtained from a godown in his employer's house without his knowledge, when it suddenly exploded and injured him.	...	1
				Total .	...	1
18	10th Jan. 1904 .	Fireworks, Chinese cracker.	Bombay . .	About 3-30 A.M. a fire broke out in the shop of a firework seller and several other premises were involved. The cause of the fire could not be ascertained; no loss of life occurred.	...	...
19	14th Jan. 1904 .	Fireworks .	Jullundur . .	A man was engaged in making fireworks at night in a shed; as the night was stormy and wet and the shed was somewhat exposed to the elements, he carried the firework mixture, about 10 lbs., into his dwelling house where his family were seated; a fire was burning at one end of the room and a gush of wind blew a spark on to the firework mixture, causing an explosion by which four people lost their lives.	4	...
20	22nd Jan. 1904.	Fireworks .	Bombay . .	A Hindu was preparing fireworks for a wedding and was grinding and mixing $\frac{1}{9}$ a seer of chlorate and $\frac{1}{9}$ a seer of sulphur on a wood stool with a big stone, when the mixture exploded injuring him severely.	...	1
21	5th May 1904 .	Fireworks consisting of chlorate of potash and sulphurate of antimony.	Manghone, Monghyr.	The Sub-Divisional Officer reported that a native mixed chlorate of potash with sulphurate of antimony preparatory to tying it up in small quantities with pieces of small stones to make bombs. Some of the stones fell into the mixture which caused it to explode and injured the man.	...	1
22	2nd June 1904 .	Firework consisting of chlorate of potash and sulphur.	Calcutta . . .	The Commissioner of Police reported that a native was grinding some ingredients for the purpose of making green light powder when there was a sudden explosion. He was thrown into a ditch adjoining the garden in which he had his licensed fireworks factory and killed. The fire spread to a quantity of gunpowder which was about 5 cubits away, burning a lad severely. It seems likely that the deceased was grinding chlorate of potash with sulphur, mistaking the formers for Baryta.	1	1
23	14th July 1904 .	Crackers .	Delhi Railway Station.	The Deputy Commissioner, Delhi, reported that two boxes said to contain locks, kites (patang) and glue were being despatched by train to Simla; the first box supposed to contain locks, was, according to the usual railway custom, dumped down in the van when it exploded and two of the coolies were seriously injured, one of them dying of his injuries. On the other box being opened, it was found to contain crackers with a top layer of tamarind flowers and pepper. The consignor was prosecuted and sentenced to 2 years' rigorous imprisonment and a fine of Rs. 1,000 or in default 6 months' further imprisonment.	1	1

No.	Date of accident.	Nature of explosive or oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of Persons. Killed.	Injured.
				Explosives—*concld.*		
24	4th August 1904	Crackers consisting of chlorate of potash.	Calicut	The Magistrate reported that while potash crackers were being packed in a piece of cloth, they exploded and killed two boys who were doing the packing.	2	...
25	20th Oct. 1904	Chlorate of potash and momchal (sulphide of antimony).	Calcutta	The Commissioner of Police, Calcutta, reported that a man was mixing chlorate of potash and momchal in a tin box for the purpose of preparing some crackers when the mixture exploded and injured him and his wife. The man subsequently succumbed to his injuries.	1	1
26	30th Oct. 1904	Chlorate of potash and sulphide of arsenic.	Bombay	The Commissioner of Police reported that while a native was mixing chlorate of potash and sulphide of arsenic, an explosion took place injuring him slightly.	...	1
27	5th Nov. 1904	Fireworks consisting of chlorate of potash and sulphide of antimony.	Berhampur, Ganjam.	A firework dealer was mixing chlorate of potash and sulphide of antimony together for the preparation of fireworks, when the mixture suddenly exploded, presumably through friction, and injured him so that he died from the effects.	1	...
28	3rd Nov. 1904	Chlorate of potash and momchal.	Calcutta	The Commissioner of Police reported that a native was putting some chlorate of potash and momchal in a wooden box to dry in the sun for the purpose of making crackers when the mixture exploded and injured him severely. He was prosecuted for manufacturing fireworks without a license and fined.	...	1
29	11th Nov. 1904.	Fireworks. Bombs consisting of chlorate of potash and arsenic de-sulphide.	Calcutta	A native was making smaller bombs from larger ones and when pressing one of them in his hands it exploded causing injuries.	...	1
30	Nov. 1904	Fireworks consisting of chloride of potassium and strontium.	.....	While mixing chloride of potassium and strontium for the manufacture of fireworks, an explosion occurred injuring the hands of a lad who was mixing these ingredients.	...	1
				TOTAL	10	9
				Petroleum.		
31	13th Jan. 1904	Crude oil	Duneedaw, Burma	A fuel barge of the Burma Oil Company, which contained four tanks, was being filled with crude oil through pipes. The fuel barge carried a mooring lamp. At about 7-15 P.M. two tanks had been completely filled. Shortly after one of the native employés took the lamp to see how much oil there was in the third tank with the result that there was an explosion injuring two men and flames broke out on the barge. These were apparently successfully put out when a second explosion occurred, injuring 5 more men. One of the men died from his injuries.	1	6
32	11th March 1904	Petrol	Malabar Point, Bombay.	A fire broke out in a shed used as a petrol store room near the upper gate of Government House, Malabar Point, Bombay. The fire was extinguished but not before the shed had been destroyed. It appears that one of the servants went into the shed with a hurricane lamp, and was filling the petrol tank of a motor car with petrol, when the liquid ignited and set the structure on fire. The room contained rubber tyres for a motor car, which were so damaged as to render them useless. The total damage done by the fire was estimated at Rs. 800.	...	...
33	14th March 1904	Earth oil	Nyounghla	The steamer *Yomah* arrived at Nyounghla at about 3-30 P.M. with two flats. The port flat had on board the animals of a circus and the starboard flat had a cargo of rice bags, cases of kerosene oil, bundles of packing leaves, dried fish, etc. This flat was taking in a cargo of 112 barrels of Yenangyaung earth oil, when about 5-30 P.M. smoke and flames were seen rising between the flat and the steamer just by the paddle box, and soon the flat and steamer were on fire. The reason given for the accident was that probably oil had leaked and trickled down from the flat into the water and remained there floating and had been ignited by a match, cheroot or hot cinders which had been thrown overboard. Most of the people met their deaths by drowning in endeavouring to get away from the burning steamer.	31	...
34	19th April 1904.	Kerosene	Cannanore	A tin of kerosene oil was kept near an oven in a native's house, and the vapour from it caught fire from the oven which resulted in three persons who were near by being seriously injured, two of whom died subsequently from the injuries.	2	1

No.	Date of accident.	Nature of oil or chemical.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons. Killed.	Injured.
				Petroleum—*concld.*		
35	3rd June 1904	Kerosene	Kotri	The Magistrate of Karachi reported that two European lads were playing in the verandah of the Railway quarters and one of them struck a match and threw it into a tin of kerosene oil which immediately caught fire and burnt the staircase and some furniture. One lad died through the burns received and the other was seriously injured.	1	1
36	6th July 1904	Kerosene	Calicut	A Moplah was trying to open a tin of kerosene oil by melting the soldering of the tin cap with a lighted wick. A conflagration occurred and the man and his two children, who were near by, were covered with burning oil, resulting in the death of all three.	3	0
37	14th July 1904	Petrol	Bhowanipur, Calcutta.	The Commissioner of Police, Calcutta, reported that on the morning of the 14th July, a native passing by one end of a building noticed a light in a room reserved for the storage of petrol. The door of the room was locked, but on opening it, he found that two one-gallon tins of petrol were on fire. A number of persons had assembled near the window of the room when it appears some one struck the tins with a bamboo. The tins broke and the flames shooting through the window into the street, injured six people, four of whom succumbed to the injuries.	4	2
38	16th July 1904	Kerosene	Arkonam	A wagon containing kerosene oil in tins collided with an engine and the burning ashes set fire to the oil. No one was injured, but 50 tins of oil were destroyed.	...	...
				TOTAL	42	10
				Chemicals.		
39	1st March 1904	Nitric acid	Madras	In the laboratory of the Survey Office of the Board of Revenue, a native lithographer poured a quantity of nitric acid into a bottle containing a little varnish in order to clean it, and shook the bottle. The bottle immediately burst and the broken pieces hit him and two other men, injuring the former severely and the other two slightly.	...	3
40	23rd May 1904	Liq. Ammoniæ Fort.	Calcutta	The Commissioner of Police, Calcutta, reported that a lady went to a shop in the New Municipal Market and wanted a bottle of Liq. Ammonia Fort, but the firm having none in stock sent for a bottle, and when it was brought, the lady wanted it opened. On the bottle being opened some of it spouted out and a native gentleman who was seated near, got some of the ammonia into one of his eyes.	...	1
41	6th Oct. 1904	Red arsenic and potash.	Bombay	The Commissioner of Police reported that a Marwari took out of a cupboard a parcel containing red arsenic and another containing potash. He took the potash by mistake for alum, intending to dye his turban red, with a mixture of red arsenic and alum. While mixing the potash and arsenic, the compound exploded, causing serious injuries to his person.	...	1
42	Ditto	Nitric Acid.	Madras	The Commissioner of Police reported that a hand cart containing cases of nitric, sulphuric and muriatic acid was being drawn from the Customs House to a godown. While unloading the cases, one of the coolies who was carrying a case of nitric acid had his body burnt by some of the acid which was leaking, and he dropped the case on the ground. The acid got liberated and was thrown about injuring three other coolies who were in the godown.	...	4
				TOTAL	...	9
				Miscellaneous.		
43	11th Feb. 1904	Cargo, consisting of ammunition, oil, matches, sulphuric acid and general goods.	Sara	A flat loaded with general cargo was taken across to Sara by the steamer *Prince Alfred* and moored there by about 5·30 the same day. About 11-30 P.M. an alarm of fire was raised. The flat was cut adrift and allowed to go down the stream for about 200 yards where the crew dropped anchor. The fire was raging so furiously that the steamer *Prince Alfred* could not get near enough to use her pumps. The cargo amounting to over a lakh of Rupees was completely destroyed.	...	...
44	13th May 1904	Matches	Nyaungyan	At about 5 in the morning a wagon attached to a goods train was found on fire. It contained 16 cases kerosene oil, 72 tins of kerosene oil and cocoanut oil mixed, 3 kegs of paint, matches, brooms, dusters, etc. The cause of the fire is attributed to sparks from the engine getting into the wagon which had an opening in the top. The oil was untouched and only matches, brooms, dusters and waste paper with some miscellaneous things were found burning.	...	...

Miscellaneous—*concld.*

No.	Date of accident.	Nature of substance.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons. Killed.	Injured.
45	July 1904.	Fulminate of silver.	Bangalore . .	An officer of the 64th Pioneers, while conducting certain experiments with fulminate of silver in his bungalow, met with a serious accident by the explosion of the same. A finger of his right hand had to be amputated, he lost the use of one eye and partial use of the other.	...	1
46	14th Sep. 1904.	Bengal matches.	Madras . .	The Commissioner of Police reported that a consignment of 16 cases of Bengal matches were brought to the Port Trust combustible shed. Thirteen of these were removed into the shed, and after dark, coolies were bringing the others in and while rolling a case along outside it took fire, probably due to friction. The whole case was destroyed.	...	...
47	29th Nov. 1904.	Matches .	Sion . . .	The Commissioner of Police, Bombay, reported that a fire occurred in the magazine of Mr. Currimbhoy Ebrahim, and it appears that the owner was moving some cases of matches (Bengal lights) manufactured at Ahmedabad to the magazine. Smoke having been seen issuing from one of these cases after being placed in the magazine, an attempt was made to remove it, but before this could be done flames broke out and three other boxes with matches which were on top of it were set on fire. Other cases of matches in close proximity next caught fire and also a box of Chinese crackers, which, after being thrown out into the compound, exploded. The first case which took fire was then thrown out into the compound where the contents slowly burned away, the charred sides of the case remaining only. The only damage done to the other cases by the fire was that one side of each case was either scorched or partially charred, but the contents of most of them were damaged by water pumped over them. Fortunately the fire occurred near the main doorway, otherwise the magazine, which contained about 800 cases of Chinese crackers, might have been considerably damaged if not completely wrecked. Owing to the Government of India having decided to follow the ruling in England, that these matches are not explosives, they will not be allowed to be stored with explosives in future.	...	...
				TOTAL :	...	1

Summary of accidents during the year 1904.

Explosive or dangerous and inflammable substance.	Accidents causing loss of life and bodily injury.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons.			
		Killed.	Injured.		
EXPLOSIVES.					
Gunpowder	11	25	30	...	11
Dynamite	5	3	10	...	5
Ammunition	1	...	1	...	1
Fireworks	12	10	9	1	13
TOTAL	29	38	50	1	30
PETROLEUM.					
Petroleum generally	6	42	10	2	8
TOTAL	6	42	10	2	8
CHEMICALS.	4	...	9	...	4
TOTAL	4	...	9	...	4
MISCELLANEOUS.	1	...	1	4	5
TOTAL	1	...	1	4	5
GRAND TOTAL	40	80	70	7	47

APPENDIX C.

Detailed Statement showing the number of accidents and persons killed and injured during the five years 1900 to 1904.

Year.	Gunpowder.			Dynamite and other nitro-compound blasting explosives.			Ammunition.			Fireworks.		
	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.
1900	5	22	5	3	...	4	...	...	...	8	4	9
1901	9	8	10	7	3	14	...	...	...	12	12	18
1902	10	8	8	2	1	4	...	...	...	25	22	40
1903	5	9	1	7	5	18	...	...	...	20	8	26
1904	11	25	30	5	3	10	1	...	1	13	10	9
Total	40	72	54	24	12	50	1	...	1	78	56	102
Average	8	14	11	5	2	10	1	...	1	16	11	20

Year.	Petroleum.			Chemicals.			Miscellaneous.		
	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.
1900	3	14	...	6	1	11	...	...	...
1901	6	21	3	4	1	1	...	...	...
1902	3	7	1	5	2	2	2	4	...
1903	9	13	14	2	6	3	...	...	...
1904	8	42	10	4	...	9	5	...	1
Total	29	97	28	21	10	26	7	4	1
Average	6	19	6	4	2	5	1	1	...

APPENDIX D.

Comparative Statement showing the number of accidents and persons killed and injured during the five years 1900 to 1904.

Year.	ACCIDENTS CAUSING LOSS OF LIFE OR BODILY INJURY.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons.			
		Killed.	Injured.		
1900	23	41	29	2	25
1901	32	45	46	6	38
1902	42	44	55	5	47
1903	35	41	62	8	43
1904	40	80	70	7	47
Total	172	251	262	28	200
Average	34	50	52	6	40

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1904 to 31st December 1904.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons.	
					Killed.	Injured.
Government Accidents.						
1	23rd January 1904.	Shell . .	At the Artillery Field Firing Camp near Poona.	A gun belonging to the 29th Field Battery had just been shifted from one position to another and was about to be fired in the new position when the shell in the gun exploded while the breech was being closed. The breech block was blown clean out. Two men were killed and one injured by the explosion. The shell which exploded had been carried from the last position in the axletree box.	2	1

APPENDIX E.

Statement showing the imports of explosives by sea into British India from other countries in the year 1904.

Quantity.	Imports in 1904. Bengal.	Bombay.	Sind.	Madras.	Burma.	Total.
Gunpowder, black . . . lbs.	64,300	1,16,375	2,09,000	78,675	5,575	4,73,925
Gunpowder, smokeless . . „	13,345	5,526	27,375	2,000	...	48,246
Dynamite . . . . . „	79,968	...	...	30,000	40,000	1,49,968
Blasting Gelatine . . . „	5,040	...	...	8,90,000	...	8,95,040
Gelignite or Gelatine Dynamite. „	20,048	...	...	35,000	...	55,048
Other nitro-compound explosives „	62,738	68,073	...	...	...	1,30,811
Detonators . . . . No.	...	...	35,000	29,76,000	9,000	30,20,000
Fireworks . . . . lbs.	...	21,54,905	9,439	90,543	9,275	22,64,162
Total lbs.	2,45,439	23,44,879	2,45,814	11,26,218	54,850	40,17,200
Total No.	...	...	35,000	29,76,000	9,000	30,20,000
Value in Rupees.						
Gunpowder, black . . .	52,666	51,761	61,486	28,675	6,220	2,00,808
Gunpowder, smokeless . .	37,547	21,701	37,621	7,347	...	1,04,216
Dynamite	64,753	...	...	22,720	32,000	1,19,473
Blasting Gelatine	5,216	...	...	8,41,768	...	8,46,984
Gelignite or Gelatine Dynamite	16,338	...	...	27,802	...	44,140
Other nitro-compound explosives	56,919	29,453	...	...	...	86,372
Detonators	15,274	...	1,035	56,593	530	73,432
Fireworks	15,692	4,98,788	5,392	26,388	6,508	5,52,768
Total Rs.	2,64,405	6,01,703	1,05,534	10,11,293	45,258	20,28,193

APPENDIX F.

Comparative Statement showing the import of explosives by sea into British India from other countries during the four years 1901 to 1904.

	1901.	1902.	1903.	1904.
Gunpowder, black . . . lbs.	1,78,259	2,11,035	2,72,423	4,73,925
Gunpowder, smokeless . . „	17,379	26,605	31,004	48,246
Dynamite . . . . . „	3,55,080	1,89,896	4,16,480	1,49,968
Blasting Gelatine . . . „	6,10,000	7,25,000	8,43,432	8,95,040
Gelignite or Gelatine Dynamite . „	61,950	50,000	22,096	55,048
Other nitro-compound explosives „	1,25,529	1,07,071	2,22,104	1,30,811
Detonators . . . . No.	26,79,000	32,97,509	43,88,400	30,20,000
Fireworks . . . . . lbs.	8,33,268	11,47,223	19,71,317½	22,64,162
Total lbs.	21,81,465	24,56,830	37,78,856½	40,17,200
Total No.	26,79,000	32,97,509	43,88,400	30,20,000

APPENDIX G.

Licenses for the possession of dangerous petroleum otherwise than in bulk may granted subject to the following conditions:—

(*a*) That it is stored in gas-tight tin or galvanized sheet iron, steel or lead plate drums or receptacles containing each not more than 10 gallons and fitted with well-made filling holes and well-fitting screw plugs or fitted with screw cap with metal air-tight under-cap. Such drums or receptacles shall be packed in strong wooden cases, the thickness of the wood to be not less than half an inch. Provided that wood cases shall not be necessary when the drums or receptacles are made of tin, galvanized sheet iron, or steel, and have the following thickness of metal :—

	Not less than
(1) when the capacity does not exceed 2 gallons	25 B. W. G.
(2) when the capacity exceeds 2 gallons but does not exceed 4 gallons	22 B. W. G.
(3) when the capacity exceeds 4 gallons	16 B. W. G.

(*b*) That an air space of at least one-tenth of its capacity must be left in each drum or receptacle.

(*c*) That the drums or receptacles shall be so substantially constructed and secured as not to be liable except under circumstances of gross negligence or extraordinary accident to be broken or become defective, leaky or insecure.

(*d*) Before any vessel containing, or which has contained, dangerous petroleum is repaired by the licensee, or is sent by him to be repaired, that vessel shall, as far as practicable, be cleared of all dangerous petroleum and of all dangerous vapours arising from the same.

(*e*) That the building in which petroleum is to be stored must be constructed of masonry or other uninflammable material with terraced, tiled or iron roof and a tiled, paved or earthen floor.

(*f*) The doorways and other openings of such buildings must be built up to such a height above the level of the road or street or the floor must be sunk to such a depth below the level of the road or street, that the petroleum stored in it cannot flow out of the building in the case of its escape from the receptacles in which it is contained, *or* the building itself must be surrounded with a masonry wall or embankment sufficiently high to contain all the petroleum in the building in case of its escape therefrom, *or* a combination of these methods may be adopted.

(*g*) All ventilating openings in the building shall be protected by strong wire gauze.

(*h*) No smoking or light or fire of any description shall be permitted at any time within or near any building licensed under this rule.

(*i*) All due precaution shall be taken for the prevention of accidents by fire or explosion and for the prevention of unauthorised persons having access to any dangerous petroleum or to any vessels containing or intended to contain or having actually contained the same.

(*j*) Every person managing or employed on or in connection with any such licensed place of storage shall abstain from any act whatever which tends to cause fire or explosion and which is not reasonably necessary and shall prevent any other persons from doing such act.

(*k*) The store-house shall be liable to inspection by an officer authorised on this behalf.

(*l*) No drum or other receptacle containing dangerous petroleum shall be opened or the petroleum drawn off within the room in which the stock of petroleum is kept.

(*m*) The filling or replenishing of any vessels with dangerous petroleum shall not be carried on nor shall the contents of any such vessel be exposed in the presence of fire or artificial light except a light of such strength, position and character as is not liable to ignite any inflammable vapour arising from the dangerous petroleum, and no artificial light shall be brought within

dangerous proximity of the place where any vessel containing dangerous petroleum is kept.

(*n*) The following distances are to be kept clear from the protected works round the place of storage .—

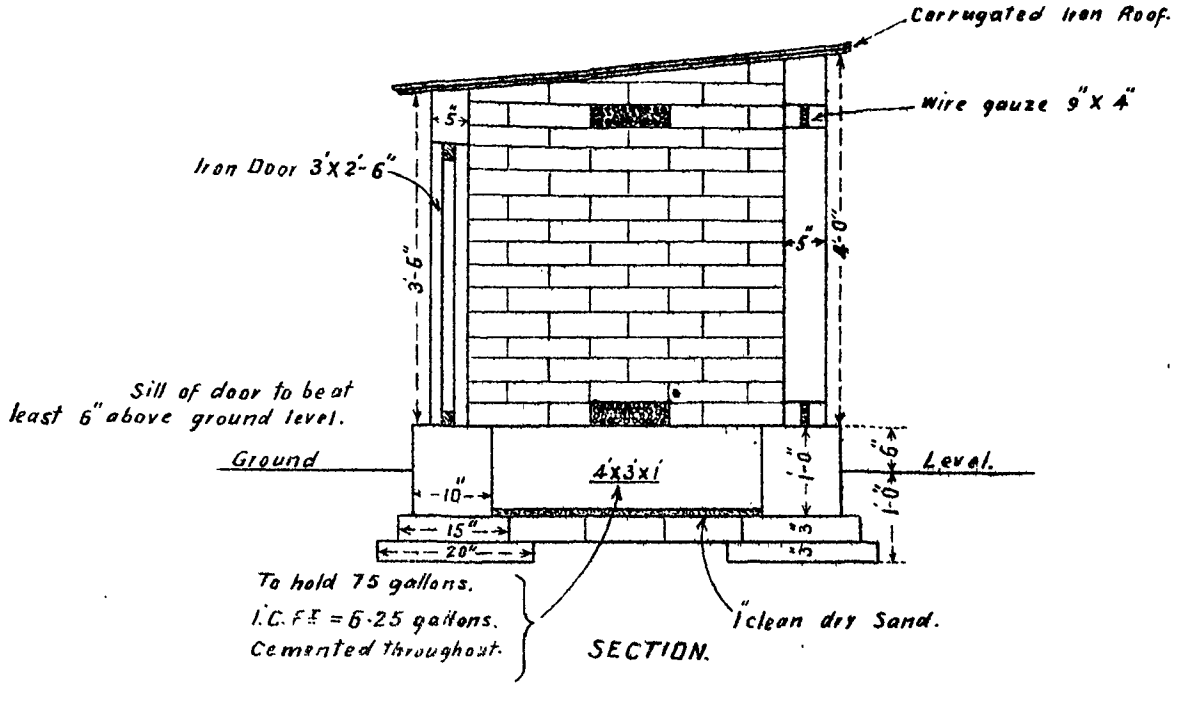
Quantity to be stored.	Distances to be kept clear when dangerous petroleum is stored in drums of not greater capacity than 4 gallons.	Distances to be kept clear when dangerous petroleum is stored in drums of capacity exceeding 4 gallons, but not exceeding 10 gallons.
Gallons.	Feet.	Feet.
Not exceeding 1,000	25	30
From 1,000 to 5,000	40	50
Do. 5,000 to 10,000	60	70
Do. 10,000 to 15,000	90	100
Do. 15,000 to 20,000	130	150
Do. 20,000 to 30,000	180	200
Do. 30,000 and over	200	200

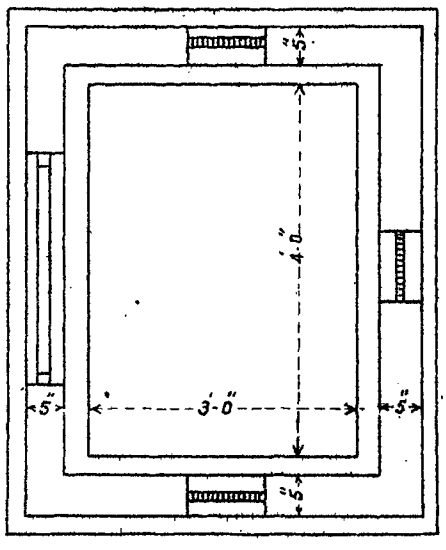
(*o*) Provided that when the quantity to be possessed does not exceed 40 gallons, the provisions of sub-rules (*e*), (*f*) and (*n*) shall not apply, but the licensee shall observe the following conditions :—

(*p*) The store-house or building in which the dangerous petroleum is stored shall be well ventilated and constructed of uninflammable material, provided however that the doors and windows may be of wood.

(*ii*) Where a store-house forms part of or is attached to another building and when the intervening floor or partition is of an unsubstantial or inflammable character or has openings therein, the whole of such building shall be deemed to be the store-house and no portion of such store-house shall be used as a dwelling-house or as a place where persons assemble. The store-house shall have a separate entrance from the open air distinct from any building or dwelling in which persons assemble.

APPENDIX H.





PLAN.

Scale 1/2" to 1 Foot.

(Sd) C. A. MUSPRATT-WILLIAMS, MAJOR R. A.
Chief Inspector of Explosives, India.
16-12-04.

D. R. C? OFFICE - 27-6-05— 400

APPENDIX I.

Notes on the construction of store-houses for the possession of petrol by motorists.

The store-house must be sufficiently large to conveniently contain the number of drums allowed to be stored under the license.

2. The walls should preferably be of masonry of one brick thickness, but the rules permit of any uninflammable material.

3. The door should be of iron, and open outwards.

4. Arrangements should be made to ensure that 75 gallons of petrol (that is, 60 gallons, the maximum allowed to be stored under the license with an additional 20% for a safety margin) can be contained without overflow, in case of its escape from the drums, either in the building, or within a containing wall outside it, if this latter method is preferred. An enclosure of 12 cubic feet can be considered sufficient to contain 75 gallons. Hence, if the sill of the doorway be one foot above floor level, the floor space inside the building must be $4' \times 3'$ to form a sort of tank. The floor of the store-house need not necessarily be sunk below ground level.

5. The roof may be of brick, or of corrugated iron, painted white, to reduce the temperature inside the store-house.

6. Ventilators should be made by leaving out a single brick in the walls, which would make an opening about 9 inches by 4 inches. Such openings should be covered with strong wire gauze. The lowest row of the ventilators should be on the same level as the top of the sill of the doorway. There should be at least two rows of ventilators and at least one ventilator in each row.

7. There should always be a layer of sand on the floor of the store-house, and a bucket of sand should be kept in the corner near the door.

G. C. Press, Simla.—No. 7 C. I. E.—17-8-05.—400—J. D.

APPENDIX J.

CHIEF INSPECTOR OF EXPLOSIVES IN INDIA.

NOTIFICATION.

Dated Simla, the 29th May 1905.

No. 556.—With reference to the Commerce and Industry Department Notification No. 1962-G., dated the 29th May 1905, publishing draft amendments which it is proposed to make in the rules to regulate the transport and importation of explosives, published with the like Notification No. 5528, dated the 11th October 1901, the following draft list of "authorized explosives" referred to in draft rule 2 (1) of the above draft rules is published for the information of persons likely to be affected thereby, and will be taken into consideration on or after the 1st August 1905.

LIST OF AUTHORISED EXPLOSIVES.

The following explosives are at present authorised for importation into British India for general sale:—

Class 1.—GUNPOWDER.

GUNPOWDER.

Class 2.—NITRATE MIXTURE.

RIPPLENE.

Class 3.—NITRO-COMPOUND.

Every explosive in this class and every explosive ingredient thereof shall be so thoroughly purified and otherwise of such character as to satisfy a test known as the heat test, and specified in Schedule A of Home Department Notification No. 5529, Public, dated the 11th October 1901.

Division 1.

AMBERITE NO. 1.
BALLISTITE.
BLASTING GELATINE.
CARBONITE.
CORDITE.
CORDITE, M. D.
DYNAMITE.
GELATINE DYNAMITE NO. 1.
GELATINE DYNAMITE NO. 2, OR GELIGNITE.

Provided that every explosive in this division shall be of such character and consistency as not to be liable to liquefaction or exudation.

Division 2.

AMBERITE NO. 2.
COOPPAL'S POWDER.
E. C. SPORTING POWDER.
EMPIRE POWDER.
GUNCOTTON.
HENRITE.
SCHULTZE GUNPOWDER.
KYNOCH'S SMOKELESS SPORTING POWDER.
NEGRO POWDER.
PICRIC ACID.
PICRIC POWDER.
RIFLEITE.
ROBURITE.

S. R. POWDER.
S. S. POWDER.
SMOKELESS POWDER.
SMOKELESS BLASTING POWDER.

Class 4.—CHLORATE MIXTURE.

Nil.

Class 5.—FULMINATE.

Nil.

Class 6.—AMMUNITION.

Division 1.

SAFETY FUZES FOR BLASTING.
SAFETY ELECTRIC FUZES.
PERCUSSION CAPS.
RAILWAY FOG SIGNALS.
SAFETY CARTRIDGES.

Division 2.

CARTRIDGES FOR CANNON, SHELLS, MINES, BLASTING OR OTHER LIKE PURPOSES.
CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.

ELECTRIC FUZES.
FUZES FOR BLASTING WHICH ARE NOT SAFETY FUZES.
FUZES FOR SHELLS.
TUBES FOR FIRING EXPLOSIVES.
WAR ROCKETS.

Division 3.

CARTRIDGES FOR SMALL ARMS, WHICH ARE NOT SAFETY CARTRIDGES.
DETONATORS.
ELECTRIC DETONATORS.
FUZES FOR BLASTING WHICH ARE NOT SAFETY FUZES.
FRICTION TUBES.
FUZES FOR SHELLS.
TUBES FOR FIRING EXPLOSIVES.

Class 7.—FIREWORK.

Division 1.

Nil.

Division 2.—Manufactured Fireworks.

MANUFACTURED FIREWORKS.
AMORCES.
CHINESE CRACKERS.

C. A. MUSPRATT-WILLIAMS, Major, R.A.,
Chief Inspector of Explosives in India.

APPENDIX K.

Instructions for the destruction of Dynamite and other similar explosives.

Not more than 50 lbs. of dynamite should be destroyed at a time. A clear space of ground about 100 yards all round should be selected, and a line of shavings or dry straw or grass laid down. On this the cartridges of dynamite should be placed in a continuous line not more than two abreast with the cartridge wrappers and any other available paper below them, and with an interval of an inch between each two cartridges. Paraffin or other similar oil should then be poured over the shavings, straw or grass and cartridges to accelerate the combustion. The line of shavings, straw or grass should be prolonged some distance beyond the dynamite (say 20 feet), and lit with a short length of safety fuse and the operator should then retire quickly to a safe distance.

The ground on which the destruction is to take place should be clear of dry grass and inflammable substances. The direction of the fire should be about an angle of 45° to the direction of the wind and the fire should be ignited from the weather end.

Instructions for the destruction of Detonators.

Detonators should be disposed of by being taken to a deep river, or to the sea, and then thrown into deep water by twos and threes, or they may be thoroughly soaked in mineral oil for 48 hours and then be destroyed one at a time, under suitable precautions, by burning.

Indian Explosives Act (IV of 1884).

SEVENTH ANNUAL REPORT

OF THE

CHIEF INSPECTOR OF EXPLOSIVES IN INDIA,

BEING HIS

Annual Report for the Year ending 31st March 1906.

CALCUTTA:

OFFICE OF THE SUPERINTENDENT OF GOVERNMENT PRINTING, INDIA,

1906.

Seventh Annual Report of the Chief Inspector of Explosives, India.

No. 752.

FROM

MAJOR C. A. MUSPRATT-WILLIAMS, R.A.,
Chief Inspector of Explosives,

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,
DEPARTMENT OF COMMERCE AND INDUSTRY.

Calcutta, the 29th May 1906.

SIR,

I HAVE the honour to submit herewith a report of the work of my Department for the year ending 31st March 1906.

Personnel.

2. This Department suffered a great loss during the year in the death of Honorary Captain J. Bartlett, who was appointed Inspector of Explosives in this Department on 1st January 1900. Captain Bartlett was taken ill with dysentery while touring in the Madras Presidency, and went into the General Hospital, Madras, on the 19th September 1905. He was operated on for abscess of the liver, and succumbed a few days after on the 16th October at the age of 54. Captain Bartlett was a very hardworking, zealous officer with considerable tact, and carried out his duties most satisfactorily. He was a man of fine physique but there is no doubt that continuous travelling and climatic changes had undermined his constitution. Honorary Lieutenant J. W. Turner, Head Overseer, Proof Department, Balasore, was appointed Inspector of Explosives *vice* Captain Bartlett on the 11th December 1905.

Number of magazines.

3. During the year 1905, 108 licenses (three more than in the previous year) were granted in British India under rule 17 of the Rules to regulate the manufacture, possession and sale of explosives. The number of magazines licensed was 154, four more than in 1905, and is in excess of the number of licenses granted, because in a number of cases firms have two or more magazines under one license. A statement showing the number and location of the magazines, and also the number of licenses granted in British India is given in Appendix A. It will be seen from this statement how widely dispersed these magazines are, and consequently how much time has to be spent in getting from place to place, which necessarily, to a certain extent, curtails the number of inspections that can be made during the year.

Inspection of explosives magazines during the year.

4. During the year 237 inspections of magazines were made, a number of magazines being inspected two or three times each. Those magazines are inspected most frequently which are situated in the neighbourhood of towns or in populous localities, or which contain large quantities of explosives or any explosive, which, on account of greater susceptibility to decomposition and consequent ignition, it is considered advisable to examine and test more than other explosives. The Roburite Factory at Karachi was also inspected once. In addition to these inspections a number of registered premises were visited. A less number of

inspections of magazines was made than in the previous year, partly owing to the fact that the vacancy created by Captain Bartlett's death was not filled up for some time, and partly because considerably more visits were made to petroleum installations this year than last. Most of the small magazines in the coal districts of Bengal are in such good condition now that I do not consider it is necessary to have them inspected more than once a year, more especially as the large feeder magazines, which supply them, are inspected two or three times a year. Moreover, as stated in paragraph 11 of my Annual Report of last year, I had found some of the small oil installations near Railway Stations in such an undesirable state last year that I thought it was advisable for the Inspector of Explosives and myself to inspect as many of them this year as possible. After an experience of seven and a half years in my present appointment I can safely say that till an inspection of explosives magazines or petroleum installations has been made by this Department, it is quite unusual to find the rules or conditions of a license either observed or enforced. Cases have also occurred where petroleum installations have been in existence without any license, till the matter was brought to notice by this Department.

Condition of magazines.

5. The magazines generally are in good order, and, as usual, I have found magazine owners most willing to carry out my recommendations even when involving considerable expense, and my thanks are due to them for making my duties easy in this respect.

Condition of explosives in magazines.

6. The physical condition of all the explosives in the different magazines during the year was found to be good with the following exceptions. Some 335 lbs. of dynamite in the Railway Magazine at Bina, which had been in stock for a number of years, were showing signs of exudation, and were consequently destroyed, also 35,900 damaged detonators and 4,145 coils of safety fuse, both belonging to Messrs. Angus & Co., Madras, the latter of which had been over five years in stock and had deteriorated, were destroyed under my orders. None of the samples of explosives, taken at inspections, failed to pass the tests laid down, which were carried out as usual by the Chemical Examiners at Calcutta, Bombay, Madras and Rangoon and also by the testing officer at Karachi.

Theft.

7. During the year one case of theft of explosives was reported from the magazine of Messrs. F. F. Chrestien & Co. at Barakura in the Hazaribagh District, Bengal, in which 15 lbs. dynamite—the whole stock of dynamite at the time—700 detonators and 250 coils of fuse were removed. The thieves broke off the padlocks from all four doors during the night, and evidently made a systematic search for the explosives they required, as several burnt matches were found on the floor close to open barrels of gunpowder. It was just a chance therefore that they did not pay a fatal penalty for their daring.

Number of petroleum installations.

8. During the year under report, 308 licenses for the storage of non-dangerous petroleum, with which this Department was concerned, were granted. A list of these installations, corrected up to date and showing the districts in which they are located, is given in Appendix B.

Inspection of petroleum installations during the year.

9. During the year I personally visited the large bulk oil installations at Madras, Bombay, Karachi, Tuticorin, Calcutta (Budge-Budge and Narculdanga), Chittagong and Rangoon and also the oil fields and refineries in Assam and Burma, and a number of the minor installations were also inspected by the Inspector of Explosives and myself. In all 148 inspections were made. As I found it was impossible for me with only one Inspector under me to arrange during a year for the inspection of all the petroleum installations as well as the explosives magazines, I applied for the services of another Inspector to enable me to do so. The Government of India, however, were inclined to think that, if District Magistrates were supplied with clear and precise instructions as to the points to which attention should be directed, they could possibly inspect all minor installations efficiently and thereby obviate the necessity for a considerable amount of work which is petty in itself and which occupies a large amount of time owing to the fact that minor installations are frequently situated in somewhat inaccessible places. I accordingly drew up a list of general instructions, which I endeavoured to make as simple as possible, to guide District Magistrates in making their inspections, and also a report form to be filled up and sent to me after an inspection. These

were circulated to local Governments for necessary action and are reproduced in Appendices C and D.

Condition of large installations.

10. The large installations are usually under European supervision and are generally well looked after, although in the older installations the tanks are very much closer to each other and to other buildings than would now be allowed. Some of these installations have been in existence for many years without any accident, and, although I personally from a safety point of view would like to see some of the large tanks I have come across at a greater distance from buildings than they are, it is a difficult matter to interfere with arrangements that have been in existence for a long time unless a Municipality or Port Trust can offer suitable land elsewhere or in some way help the firms concerned. At Budge-Budge near Calcutta where there is ground available for extension, considerable progress has been made under the superintendence of the Calcutta Port Commissioners in the work of moving the storage tanks and placing them a hundred feet away from one another with an earth bund round each one. When the work has been completed, the installations at Budge-Budge should be very safe. In Bombay, ground in an isolated place near Sewri has been allotted by the Bombay Port Trust to the different oil firms, who have tanks at Mody Bay, where the new docks are in course of construction. In due course all the tanks will be moved to this new site and two large tanks, belonging to the Asiatic Petroleum Company, have already been floated and towed to their new destination.

New large bulk oil installations.

11. Two large bulk oil installations, one belonging to the Burma Oil Company, the other to the Standard Oil Company have been constructed at Karachi. At Madras the Burma Oil Company have built a large installation on the sandy accretion south of the harbour and are about to carry out further extensions. The plans of all these installations, which started work during the year, were submitted to me for approval before being sanctioned. The Standard Oil Company have also applied for a license for a large bulk oil tank at Royapuram, Madras. The Asiatic Petroleum Company will, I believe, also be shortly erecting an installation at Madras.

Condition of small bulk oil installations.

12. The small or minor installations are installations in which not more than 50,000 gallons of kerosine oil are stored, and are generally looked after by native agents, employed by the large oil firms. In last year's report I had to refer to the very undesirable condition of some of these installations. I issued a circular letter to the oil firms, pointing out the most dangerous defects I had noticed in my inspections, and asked them to help me by getting them remedied. The result of their co-operation and of the considerable amount of petroleum inspection work done by this Department has been that a decided improvement in the condition of these installations has been effected.

Accidents.

13. No accidents have occurred in the magazines or in the one explosives factory (Roburite Factory at Karachi) licensed in this country. A list of other accidents by fire or explosions that have occurred with explosives, inflammable substances, dangerous chemicals, etc., between the 1st January 1905 and the 31st December 1905, and that have been brought to the notice of this Department, is given in Appendix E, and gives a short account of each one. It will be seen from a perusal of the details that the accidents have practically all been caused by gross carelessness or through neglect of ordinary precautions. In all there were forty-four accidents causing thirty-two deaths and injuries to sixty-one. Comparative statements given in Appendices F and G show the total number of accidents and the number of persons killed and injured by them during the six years from 1900 to 1905.

Gunpowder.

14. There were seven gunpowder accidents during the year, causing the death of six persons and injuries to three. This is a considerable improvement on any preceding year.

Dynamite.

15. Dynamite (ten accidents) was responsible for six deaths and injuries to nineteen persons. Seven of these accidents occurred in blasting operations in connection with the construction of the Gaya-Khatras Railway and can only be looked upon as prevent-

able accidents, which probably would not have taken place if the precautions recommended in paragraph 9 of my fifth Annual Report had been duly observed. The frequency of these accidents caused a reference to be made to me on the subject by the Government of Bengal. The rules laid down for blasting operations on the Gaya-Khatras Railway have been examined and added to and steps have been taken to ensure that they shall be observed in future.

Fireworks.

16. Fifteen accidents from fireworks have been reported to this Department, causing thirteen deaths and injuries to twenty-six persons. Fireworks have supplied the largest casualty list during the year. Most of the accidents are caused by the Sulphur Chlorate combination of fireworks, which are prohibited in England, but which the Government of India after due consideration of all the points at issue, decided not to prohibit in India.

Petroleum.

17. There were twelve accidents from petroleum reported during the year which were responsible for seven deaths and injuries to thirteen. A slight explosion (Index No. 34 in the list of accidents) took place in a tank belonging to the Asiatic Petroleum Company at Budge-Budge on the 15th April 1905, which was the subject of a special enquiry and report by the Chief Inspector of Explosives. The most likely reason for the accident appeared to be that it was due to a spark caused by vapour pressure rupturing part of the tank owing to the ventilators being closed while oil was being pumped into the tank from an oil steamer. The explosion occurred just at the end of this operation. The direct evidence of the Manager and other employés did not, however, support this view and consequently other possibilities had to be considered, but there were no actual data from which to form a definite conclusion. As a result of the enquiry, I thought it advisable to address all the oil firms, advising them (1) to keep the ventilators in oil tanks always open, and (2) to carefully examine the foundations of their tanks from time to time in order to detect and remedy any subsidence that might occur. Two accidents (Index Nos. 39 and 40), which luckily did not turn out as serious as they might have been, occurred in Bombay Harbour during the transport of petrol by boat. The question of measures to stop accidents of this kind are under the consideration of the Bombay Port Trust, who have been in communication with me on the subject. The accidents reported this year show clearly the danger of bringing lights anywhere near petroleum vapour and demonstrate also the travelling power of that vapour. Petroleum should always be stored by itself and never in conjunction with explosives, inflammable substances or dangerous chemicals. Mixed storage of this sort caused a fire (Index No. 43) in a dangerous petroleum godown at Bombay owing to the spontaneous ignition of some phosphorus which was stored in the same place. Only lately I had to call the attention of the local authorities to a certain godown, where about 4,000 tins of kerosine and cotton and jute were all crammed together in the same room. Oily cotton and jute are very susceptible to spontaneous ignition, so that such storage is extremely dangerous and may lead to a large conflagration in a crowded area.

Government accidents.

18. Three Government accidents were reported to this Department during the year and the details are given in Appendix H. One of them was a very serious one, and occurred in the Quetta Arsenal, where a European Sergeant and four lascars lost their lives by an explosion while emptying a 6·3 inch Howitzer Common Shell. A Board of Enquiry was held and found that no blame could be attached as none of the precautions laid down appeared to have been neglected, but the Board was of opinion that the primers of shells used by heavy ordnance should be damped before being extracted from the shells.

Import of explosives.

19. One thousand four hundred and seventy tons of explosives were imported into British India during the year 1905, the value being Rs. 15,24,619. Full details showing the different kinds of explosives imported during the year, and the value of each, is given in Appendix I. A comparative statement showing the import of explosives during the five years 1901 to 1905 is given in Appendix J.

Import of petroleum.

20. During the year 1905, 88,972 gallons of dangerous petroleum and 70,110,251 gallons of non-dangerous petroleum were imported by sea into British India. The details are

given in Appendix K, and also the amounts of dangerous and non-dangerous petroleum produced in Assam and Burma during the year. In Appendix L, I also give an interesting statement, culled from the "Petroleum Review," dated 24th February 1906, showing the production of petroleum in the respective petroleum producing countries during the past three years. It will be seen that the production in India has risen from 325,400 tons to 465,000 tons.

21. Some points of interest in connection with the work done by this Department during the year are mentioned below :—

(*a*) The criticisms on the draft consolidated explosives rules for the manufacture, possession and sale of explosives have now been received by the Government of India and are under consideration, so that I hope these rules will be finally issued in a short time.

Explosives Rules.

(*b*) The Rules for the transport and importation of explosives have been amended during the year by the introduction of new and simpler rules for the packing of explosives, similar to those adopted in England. This amendment is given in Appendix M.

Packing of explosives.

(*c*) A list of explosives authorised for importation into British India for general sale, revised and corrected up to March 1906, is given in Appendix N.

List of authorised explosives.

(*d*) A rule forbidding the carriage of explosives over railway bridges, except under certain circumstances, was added during the year to the rules regulating the transport and importation of explosives—*vide* Government of India Notification given in Appendix O.

Carriage of explosives over railway bridges.

(*e*) A new notification laying down when picric acid is to be considered an explosive, will be found in Appendix P.

Picric acid.

(*f*) The rules for the transport and importation of explosives, together with those for testing explosives, are being brought up to date, and are at present under the consideration of the Government of India.

Import, transport, and testing of explosives.

(*g*) The draft consolidated petroleum rules will, it is believed, be shortly issued for criticism. Unforeseen difficulties have prevented these rules being circulated earlier, but abstracts of the rules affecting the storage of petroleum have been circulated by the Government of India.

Petroleum Rules.

(*h*) As I found that dangerous petroleum was being imported into India in kerosine tins inside wood cases and considered this dangerous, I brought the matter to the notice of the Government of India, who ruled that this procedure was to be prohibited and that dangerous petroleum must be packed only in the receptacles permitted by the rules for the storage of dangerous petroleum in this country.

Importation of dangerous petroleum in kerosine tins.

(*i*) The consolidated carbide of calcium rules have now been finally issued to local Governments for adoption. All recent changes in the English rules have been introduced into them.

Carbide of Calcium Rules.

(*j*) As the rules stand at present, the inside packing of boxes containing Sulphuric and Hydrochloric acids has to be of ashes free from cinders, or of chalk, sand or dry earth, and an application was received suggesting that straw should be substituted as a packing medium. I could not recommend the change proposed, which accordingly was not carried out.

Packing of acids.

(*k*) I was addressed during the year by the Commandant, 3rd Sappers and Miners, who desired my opinion as to the time fulminate of mercury detonators

Fulminate of Mercury detonators.

would keep in this country without deterioration :—

(i) when stored in an ordinary dwelling house,

(ii) when stored in an ordinary magazine,

and as to whether, when deterioration (loss of explosive strength) set in, the process would be probably general or whether some of the detonators would be likely to deteriorate more rapidly than others. As the questions asked are of some considerable importance affecting as they do the lives of those carrying out blasting operations, I think it as well to publish the substance of my reply as the information may be of some interest and use to the general public. I gave it as my opinion that these detonators should not ordinarily deteriorate within a period of five years in India if kept in a dry place whether in an ordinary dwelling house or in an ordinary magazine, but I considered that after five years' storage 5 per cent. of the stock should be tested by firing, and, even if found good, fresh tests should continue to be taken every two years. I also considered that deterioration, if it took place, would be usually general if the detonators were exposed to the same conditions and that the testing I suggested should be sufficient to bring to light any such deterioration. I also presumed that in actual practice the oldest stock was always issued first to prevent as far as possible the accumulation of old stock. In connection with this subject I would draw attention to para. 10 of my fourth Annual Report where I dealt with the question of the deterioration of safety fuze in this country and the possibility of accidents being caused thereby.

(*l*) This Department was consulted during the year regarding the packing necessary for anhydrous ammonia, which is compressed ammonia gas. Only a short time ago rules for the packing of carbonic acid gas were drafted by this Department and, when this reference was received, I recommended that instead of drafting rules for the packing of each kind of compressed gas, as it became introduced into India, it would be desirable to alter the Railway rules so that under a general heading "Compressed Gas," all possible kinds of compressed gases should be given, and one set of packing rules placed opposite, which should be sufficient for any particular case, as shown in Appendix Q.

Anhydrous Ammonia.

(*m*) The Port Trusts of Calcutta, Bombay, Madras and Karachi have been addressed by this Department regarding the advisability of providing spark protectors for Railway engines passing in close proximity to large bulk oil installations, and I believe steps have been taken to carry out the recommendations.

Spark protectors.

(*n*) The work of this Department keeps on increasing rapidly, more especially as regards consultation work, and this chiefly in connection with the petroleum industry. In fact, I may safely say that three-fourths of the work is occasioned by references about petroleum.

Work of the Department.

I have the honour to be,

SIR,

Your most obedient Servant,

C. A. MUSPRATT-WILLIAMS,

Major, R.A.,

Chief Inspector of Explosives.

APPENDIX A.

List of Magazines and Licenses granted under Rule 17 of the Explosives Rules for the year 1905.

Province or Presidency.	District.	Magazines			Licenses		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Bengal	Burdwan	18	3	21	15	3	18
	Darjeeling	3	...	3	3	...	3
	Gaya	7	...	7	5	...	5
	Hazaribagh	13	...	13	11	...	11
	Hooghly	4	...	4	1	...	1
	Manbhum	14	1	15	12	1	13
	24-Parganas	...	1	1	...	1	1
	Total	59	5	64	47	5	52
Bombay	Ahmedabad	...	2	2	...	2	2
	Bombay	15	1	16	9	1	10
	Karachi *	8	1	9	4	1	5
	Kolaba	...	2	2	...	1	1
	Total	23	6	29	13	5	18
Burma	Mergui	1	...	1	1	...	1
	Ruby Mines	1	...	1	1	...	1
	Hanthawaddy	2	1	3	1	1	2
	Total	4	1	5	3	1	4
Central Provinces	Jubbulpur	3	...	3	2	...	2
	Nagpur	3	...	3	2	...	2
	Raipur	4	...	4	4	...	4
	Saugor	1	...	1	1	...	1
	Total	11	...	11	9	...	9
Eastern Bengal and Assam	Cachar	1	...	1	1	...	1
	Lakhimpur	1	...	1	1	...	1
	Total	2	...	2	2	...	2
Madras	Chingleput	...	2	2	...	1	1
	Godaveri	4	...	4	2	...	2
	Madras	17	...	17	4	...	4
	Nellore	4	...	4	2	...	2
	The Nilgiris	4	...	4	2	...	2
	Tanjore	...	1	1	...	1	1
	Vizagapatam	4	...	4	2	...	2
	Total	33	3	36	12	2	14
United Provinces	Cawnpore	2	...	2	2	...	2
	Dehra Dun	1	...	1	1	...	1
	Gharwhal	1	...	1	1	...	1
	Lucknow	1	...	1	1	...	1
	Meerut	1	...	1	3	...	3
	Shahjehanpur	1	...	1	1	...	1
	Total	7	...	7	9	...	9
SUMMARY.							
Bengal		59	5	64	47	5	52
Bombay		23	6	29	13	5	18
Burma		4	1	5	3	1	4
Central Provinces		11	...	11	9	...	9
Eastern Bengal and Assam		2	...	2	2	...	2
Madras		33	3	36	12	2	14
United Provinces		7	...	7	9	...	9
	Grand Total	139	15	154	95	13	108

* At Karachi there is in addition a Roburite Factory licensed under Rule 12.

APPENDIX B.

List of non-dangerous petroleum installations licensed during the year 1905.

Province.	District.	No.
Ajmer-Merwara	Ajmer	3
	TOTAL	3
Bengal	Balasore	2
	Bhagulpur	5
	Birbhum	2
	Burdwan	7
	Calcutta	3
	Champaran	2
	Chapra	1
	Cuttack	1
	Darbhanga	4
	Gaya	4
	Khulna	1
	Manbhum	1
	Midnapur	1
	Monghyr	4
	Mozufferpur	6
	Murshedabad	1
	Palamau	1
	Patna	4
	Purnea	1
	Purulia	1
	Ranaghat	2
	Sambalpur	2
	Santal Parganas	3
	Shahabad	2
	24-Parganas	6
	TOTAL	67
Bombay	Ahmedabad	6
	Ahmednagar	2
	Belgaum	3
	Bijapur	4
	Bombay	3
	Broach	4
	Dharwar	8
	Karachi	7
	Khandesh	6
Bombay—*contd.*	Kholapur	2
	Nasik	5
	Poona	3
	Satara	2
	Sholapur	4
	Surat	4
	Thana	2
	TOTAL	65
Burma	Hanthawaddy	3
	Mergui	3
	Mingyan	1
	Pokoku	3
	TOTAL	10
Central Provinces	Akola	8
	Amraoti	6
	Bhandara	3
	Bilaspur	1
	Buldana	3
	Chanda	1
	Hoshangabad	2
	Jubbulpur	5
	Nagpur	3
	Narsinghpur	2
	Nimar	6
	Raipur	1
	Saugor	3
	Sutna	1
	Wardha	4
	TOTAL	49
Eastern Bengal and Assam	Backerganj	2
	Bogra	1
	Chittagong	2
	Jalpaiguri	1
	Mymensingh	1
	Pabna	2

Province.	District.	No.
Eastern Bengal and Assam —*contd.*	Rungpur	1
	Sylhet	1
	TOTAL	11
Madras	Anantapur	2
	Bellary	2
	Chingleput	1
	Coimbatore	4
	Cuddapah	1
	Ganjam	3
	Godavery	2
	Guntur	1
	Kistna	1
	Kurnool	1
	Madras	3
	Madura	2
	Malabar	3
	Nellore	3
	North Arcot	1
	Salem	2
	Shoranor	1
	South Arcot	5
	Tanjore	6
	Tinnevelly	3
	Trichinopoly	1
	Vizianagram	1
	TOTAL	49
N.-W. Frontier Province	Peshawar	1
	TOTAL	1
Punjab	Delhi	3
	Jullunder	1
	Lahore	2
	Ludhiana	1
	Umballa	2
	TOTAL	9
United Provinces	Agra	3
	Aligarh	1
	Allahabad	3
	Azamgarh	1
	Bahraich	1
	Bara Banki	1
	Bareilly	2
	Basti	1
	Benares	4
	Cawnpur	2
	Dehra Dun	1
	Etawah	1
	Fyzabad	2
	Ghazipur	1
	Gonda	2
	Gorakpur	2
	Jaunpur	1
	Jhansi	3
	Lucknow	4
	Meerut	1
	Mirzapur	1
	Moradabad	2
	Muttra	1
	Saharanpur	1
	Shahjehanpur	2
	TOTAL	44

SUMMARY.

AJMER-MERWARA	3
BENGAL	67
BOMBAY	65
BURMA	10
CENTRAL PROVINCES	49
EASTERN BENGAL AND ASSAM	11
MADRAS	49
N.-W. FRONTIER PROVINCE	1
PUNJAB	9
UNITED PROVINCES	44
TOTAL	308

APPENDIX C.

Instructions for the guidance of District Magistrates in making inspections of minor installations.

1. A "minor installation" means an installation—
   (*a*) capable of containing an amount of oil, whether in bulk only or in combined bulk and non-bulk storage, not exceeding 50,000 gallons, and
   (*b*) in which no tin making operations are carried on.

2. "Petroleum in bulk" means quantities of 500 gallons or upwards contained in any one tank or receptacle.

3. "Petroleum in non-bulk" is petroleum in tins, cases or drums.

4. No smoking is to be allowed in the installation.

5. All operations within the installation are to be under the supervision of a responsible agent or supervisor.

6. The ground inside the installation must be kept clean and free from goods of a dangerous nature and from vegetation and rubbish.

7. A supply of sand in buckets or other receptacles should always be kept inside the installation to extinguish fires.

8. Where there are any enclosure walls or embankments to an installation, it is necessary to ascertain that they are in good order and that all the oil licensed to be stored within them can be efficiently contained without overflow in case of its escape from the containing vessels. Certificates to this effect, signed by Civil Engineers, are laid down in the rules as necessary.

9. The capacity in gallons of every tank and storage shed should be conspicuously marked on it.

10. Where a lightning conductor is necessary under the Rules, it must be tested once a year, and a certificate showing the date of last test must be posted up in a conspicuous place in the installation.

11. No installation must be open or work permitted between sunset and sunrise.

12. Where there are any pipes or openings in enclosure walls for drainage purposes, arrangements must be made whereby they can be closed and they should only be allowed to be kept open when actually required for draining.

13. All sheds or godowns for the storage of oil in tins, drums or cases must be built of uninflammable material.

14. In a minor installation there is usually one tank, a filling and storing shed, a soldering shed, and possibly a watchman's hut. In some installations an enclosure wall surrounds the whole installation; in others, the tank only is surrounded by a wall to contain the oil if it should escape from the tank, and the floors of the godowns or sheds are sunk or the walls raised to form a tank so as to contain the oil stored in case of its escape. It is necessary to see that in case of accident the oil can be efficiently contained without overflow, whatever the method adopted for this purpose. For purposes of calculation, a cubic foot of vacant space may be regarded as able to contain 6·25 gallons.

15. The distances laid down in the rules to be kept clear between a tank and the walls or embankments which surround it must be observed for all future installations. This also applies to the height of walls and embankments.

16. The distances laid down in the rules to be kept clear round an installation, must be observed for all new installations. In case of installations, which have been in existence previous to the issue of these rules, it may not be possible to insist rigidly on these distances, but they should not be allowed to be invaded further in the future.

17. Not more than 400 cases of oil in addition to tins and drums is allowed to be stored in any installation.

18. Soldering must not be allowed in the filling shed or close to the tank.

19. No fire or lights, except those necessary in the soldering room and watchman's hut, must be allowed.

C. A. MUSPRATT-WILLIAMS,
Major, R.A.,
Chief Inspector of Explosives with the Govt. of India.

APPENDIX D.

DISTRICT.

Report on the petroleum installation of_____at_____

Licensed for the storage of_____gallons non-dangerous oil in tank (s).

_____gallons non-dangerous in tins or drums,

_____gallons non-dangerous in cases.

Local Agents or Manager_____

1. By whom inspected . . . . . .
2. Date of inspection . . . . . .
3. Of what buildings does the installation consist . .
4. Is the whole installation surrounded by a suitable wall within which all the oil licensed to be stored can be contained. If not, what arrangements exist for the purpose and are they sufficient.
5. Is the capacity in gallons of the tanks and storage shed marked on them.
6. What distance is the installation from any other installations or buildings.
7. What distance are the walls surrounding the tank from the tank itself.
8. What is the height of the enclosure wall, if any . .
9. Are the tanks and connecting pipes leaking . .
10. State the number of cases of oil in stock at the time of visit.
11. State the number of tins or drums in stock at the time of visit.
12. State the number of tins or drums of oil stored in the soldering shed.
13. Is any soldering done in the filling shed or elsewhere than in the soldering shed. If so, where.
14. Is work carried on between sunset and sunrise . .
15. Are there any fires or lights, except those allowed in the soldering and watchman's house, near the tanks or filling shed.
16. Are goods of a combustible nature kept within the installation.

17. Has the installation a lightning conductor . . .

18. If so, when was it last tested . . . . .

19. Are there any drainage pipes and are they securely closed when not in use.

20. Have the storing, filling and soldering sheds any inflammable material in their construction.

21. Is sand kept in the filling and soldering sheds . .

22. Is the installation clean and free from vegetation, rubbish, etc.

23. Are the general rules, copy of license, and lightning conductor test certificate hung up in the installation.

24. General remarks or suggestions . . . . .

APPENDIX E.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1905 to 31st December 1905.

No.	Date of accident.	Nature of explosives.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
Explosives.						
1	25th Feb. 1905.	Gunpowder .	Vengayankuppan, South Arcot.	The District Magistrate reported that a licensee spread out about 3 pounds of gunpowder in the inner courtyard of his house to dry in the sun. He took a small quantity a short distance away and set fire to it to see whether it would burn. The larger quantity in the yard caught fire from a spark and exploded, causing the death of the licensee and injuring another man.	1	1
2	10th April 1905	Powder . .	Devanur, South Arcot.	The Magistrate reported that while a native was warming some powder in a pan over some fire in the verandah of a thatched house there was a sudden explosion which caused the destruction of about 20 houses in the settlement. No lives, however, were lost. The man was prosecuted for his negligent conduct and sentenced to 2 months' rigorous imprisonment.	...	...
3	30th June 1905	Gunpowder .	Gogai, Salem .	The Magistrate of Salem reported that three holes had been made in a well for blasting. Two of them had been charged with gunpowder while the third was being rammed with an iron rammer and hammer. An explosion occurred caused by a spark, which ignited some powder near the hole, causing the death of the man carrying on the operations.	1	...
4	26th July 1905.	Gunpowder .	Coimbatore .	The Magistrate reported that as two men were making gunpowder there was an explosion owing to the wooden pestle being used too violently in the mortar, which was also made of wood.	1	1
5	8th Oct. 1905 .	Gunpowder .	Kotri . . .	The Inspector, Railway Police, reported that while a gentleman was letting off fireworks, a spark from them apparently fell into a tin of gunpowder which a servant was holding near by, although he had been warned to take it away. An explosion occurred, fatally injuring the servant.	1	...
6	12th Nov. 1905.	Gunpowder .	Rawalpindi .	The Sub-Inspector of Police reported that 25 maunds of country gunpowder which was stored in a building exploded. The accident was due to a native who is said to have been smoking in the building.	1	...
7	25th Dec. 1905.	Gunpowder .	Madras . .	The Commissioner of Police reported that while two natives were pounding a mixture of saltpetre, charcoal and sulphur, the charge exploded and injured both of them, and one of them succumbed to his injuries.	1	1
				TOTAL .	6	3
8	5th Jan. 1905 .	Dynamite .	Tunnel of the Gaya-Khatras Railway.	The Magistrate of Gava reported that while a hole for blasting was being drilled near an unexploded charge of dynamite, the charge exploded.	1	1
9	7th Feb. 1905 .	Dynamite .	Tunnel of the Gaya-Khatras Railway.	The Magistrate of Gaya reported that during blasting operations there were five misfires of which only four were traced, and it is presumed that the injured men found the other hole in which the unexploded charge was and, taking advantage of the fact that they were being paid by the number of holes drilled, started work on the hole with the result that the unexploded charge suddenly exploded, injuring the two men.	...	2
10	11th April 1905.	Dynamite .	Tunnel No. 1, Gaya-Khatras Railway.	The Magistrate of Gaya reported that a new blasting hole was being drilled about 2 feet away from a charge, which had misfired on the same day, when an explosion occurred by which one man lost his life and another was seriously injured.	1	1
11	18th April 1905	Dynamite .	Patwas, Gaya-Khatras Railway.	The Magistrate of Gaya reported that two men were drilling in some blast hole which had evidently misfired some days previously, when the charge suddenly exploded.	1	1

No.	Date of accident.	Nature of explosives.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
				Explosives—*contd.*		
12	9th May 1905 .	Dynamite .	Tunnel No. 11, Gaya-Khatras Railway.	The Magistrate reported that on the morning of the accident 27 shots were fired in three lots. One misfire was noticed and successfully refired. While two coolies were removing the loosened rock, it is presumed that one of them came across a portion of a partly exploded charge probably of a former blast, which exploded and injured them both.	2	...
13	11th May 1905.	Dynamite .	Gaya-Khatras Railway.	The Engineer in Charge, Gaya-Khatras Railway, reported that after clearing away the *débris* caused by a previous blast, the men proceeded to bore new holes and it appeared that an unexploded hole got covered with the *débris* and without noticing this, two men commenced boring close to an old hole slantwise and after going down a little way the end of the jumper touched the unexploded cartridge and fired it, resulting in injuries to five men.	...	5
14	30th June 1905 .	Dynamite .	Burma Ruby Mines.	The District Magistrate, Burma Ruby Mines District, stated that during drilling operations for blasting in a tunnel an explosion occurred by which one man was so badly injured that he died shortly after and another was injured. The Magistrate was of opinion after visiting the scene of the accident that the accident occurred owing to a man drilling into the base of an old blast hole which must have had some small amount of dynamite left in it unexploded.	1	1
15	7th August 1905	Dynamite .	Gaya-Khatras Railway.	The Magistrate of Gaya reported that five blast holes were charged and fired by coolies. Only three charges appeared to have exploded, and after waiting 8 or 10 minutes the coolies went to examine the place and when they were within 17 feet of the holes one of the charges exploded injuring both men.	...	2
16	20th Sep. 1905 .	Dynamite .	Mogok . .	During drilling operations for blasting in the Taraktan mine, an explosion occurred due to boring into an old bore hole where there was evidently some unexploded dynamite.	...	4
17	23rd Dec. 1905.	Dynamite .	South Coorg .	The Executive Enginer, Coorg Division reported that during blasting operations two coolies were injured, owing to working on a hole in which one of the old charges must have been left unexploded.	...	2
				TOTAL .	6	19
18	7th Feb. 1905 .	Fireworks. A bomb composed of potassium chlorate and red arsenic.	Calcutta . .	The Commissioner of Police, Calcutta, reported that a native set fire to a bomb with a match and it exploded injuring 7 men who were near, one of whom subsequently succumbed to injuries received.	1	6
19	7th March 1905 .	Fireworks consisting of potassium chlorate and red arsenic.	Hazipur, Noakhali	The Magistrate of Noakhali reported that, while three natives were manufacturing fireworks, the firework composition suddenly caught fire and the three men were seriously burnt, one of them succumbing to his injuries.	1	2
20	8th April 1905 .	Fireworks consisting of nitrate of baryium and nitrate of strontium, sulphur, lamp black, sticklac and chlorate.	Pattukkottai, Tanjore.	The Magistrate reported that a native with the assistance of four others was making fireworks. While the ingredients were being pressed into a receptacle, they took fire and exploded. The five men were killed and a woman, who was near by, was injured.	5	1
21	28th May 1905 .	Fireworks consisting of sulphur, saltpetre charcoal and sulphide of arsenic.	Tirutturaipundi .	The Magistrate reported that a native, the servant of a license holder, took a firework and made a hole in it to put in gunpowder and a wick, and rammed the powder with a stick. During the process of ramming, the firework took fire, and was thrown down with the result that the other fireworks in the hut caught fire. It appears that the licensee was manufacturing gunpowder in a hut set apart for storage only and he was prosecuted, fined and his license cancelled.	...	2
22	18th June 1905 .	Fireworks consisting of red arsenic and potassium chlorate.	Chanda . .	The District Magistrate reported that while some of the composition was being rammed into a barrel, it exploded injuring two lads, one of whom subsequently died and also injuring the boy who was ramming the charge. Some sparks from the explosion fell on some potassium chlorate which a third youth was holding in his hand and caused its explosion with the result that his hand was blown off.	1	3

No.	Date of accident.	Nature of explosives or oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			Explosives—*concld.*			
23	12th Sep. 1905 .	Fireworks consisting of chlorate of potash, sulphide of arsenic, chlorates, sulphates and nitrates.	Entally, Calcutta .	The Commissioner of Police reported that a native who had no license to manufacture or possess fireworks was preparing some bombs, when from some cause or another an explosion occurred whereby he was injured and removed to hospital but died shorty after admission. The scrapings from the floor were sent to the Chmical Examiner to Government who found them to contain the chemicals mentioned in column 3.	1	...
24	1st October 1905 .	Fireworks consisting of chlorate of potash and sulphide of arsenic.	Calcutta . .	The Commissioner of Police, Calcutta, reported that, while a native was preparing fireworks and was stirring the two mixtures with a knife in a piece of paper, the mixture exploded burning him severely.	...	1
25	8th Oct. 1905 .	Fireworks consisting of chlorate of potash and momchal.	Balliaghatta .	The Inspector of Police reported that while a native was mixing the two ingredients, an explosion occurred injuring him severely.	...	1
26	10th Oct. 1905 .	Fireworks consisting of sulphide of antimony and chlorate of potash.	Tanjore . .	The Magistrate reported that a native lad was preparing small bombs and was grinding the ingredients on a stone when they exploded killing him on the spot.	1	...
27	27th Oct. 1905 .	Fireworks consisting of chlorate of potash and sulphide of antimony.	Calcutta . .	The Commissioner of Police reported that, whilst two native women were making fireworks, one of the fireworks fell out of the hands of one of the women into a small tin box containing a mixture of the explosives and exploded injuring both women and four children who were near by, one of whom died subsequently.	1	5
28	27th Oct. 1905 .	Cracker consisting of sulphur and chlorate of potash.	Calcutta . .	The Superintendent of Police reported that while a native was dragging down a bag of grain from the top of a heap of grain bags, it dropped down on to the floor and on a cracker which was not noticed, with the result that the cracker exploded injuring the cooly. How the cracker got into the godown could not be ascertained.	...	1
29	27th Oct. 1905 .	Cracker consisting of chlorate of potash and sulphide of antimony.	Dharmapuri, Salem	The Magistrate reported that a native was amusing his child by lighting fireworks, and sparks fell on some crackers, and an explosion occurred causing him such injuries that he died.	1	...
30	28th Oct. 1905 .	Fireworks consisting of chlorate of potash and sulphide of arsenic.	Calcutta . .	The Commissioner of Police reported that a native was breaking up two of the fireworks to make them into a large one when they exploded injuring him.	...	1
31	8th Nov. 1905 .	Fireworks consisting of sulphur, chlorate of potash, charcoal, iron and steel filings.	Bombay . .	The Commissioner of Police reported that some loose ingredients were swept up from a room inside a house and spread out in the sun to dry. A woman took the ingredients and was pounding them in a mortar when they exploded injuring her so severely that she succumbed from the effects the next day.	1	...
32	25th Nov. 1905	Fireworks consisting of chlorate of potash, red arsenic and sand.	Bombay . .	The Commissioner of Police reported that while a native was mixing the ingredients between two stones, they exploded injuring the man and three women who were near by.	...	3
				TOTAL .	13	26
			Petroleum.			
33	9th Feb. 1905 .	Petrol . .	Calcutta . .	The Commissioner of Police, Calcutta, reported that about 8 P.M. a motor car was being filled with petrol by means of a tin can, while the petrol drum was placed on the left step of the car and a native was holding a lamp about a yard away, when suddenly a flame shot up from the tank caught the tin can and then shot across to the petrol drum and there was a general blaze. The owner of the machine and his chauffeur were injured and also a horse which was in some stables near by which caught fire. The horse had to be shot. The car was slightly burnt.	...	2

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
				Petroleum—*contd.*		
34	15th April 1905 .	Petroleum .	Budge-Budge .	At about 9-20 A.M. there was a slight explosion at No. 9 tank belonging to the Asiatic Petroleum Company. The Superintendent, Petroleum Wharf, who was close by at the time, saw part of the roof of the tank raised, and a rush of flame issuing. The roof appears then to have fallen back and dense smoke took the place of the flames. No one was hurt and the extent of damage done was only Rs. 1,000. The adjoining tank, which was within a few feet, and contained oil, was not affected. An oil steamer was just finishing pumping oil into the tank at the time of the explosion. A special enquiry was held by the Chief Inspector of Explosives who forwarded a report on the same to the Government of India and the Government of Bengal.	...	...
35	26th June 1905 .	Kerosine .	Lakhipur, Noakhali.	The Magistrate reported that a native child, who was amusing herself by lighting straw at a kerosine lamp near a tin of kerosine oil accidently dropped a lighted straw into the tin, whereupon the oil caught fire with the result that the house was burnt down and three children burnt therein.	3	...
36	27th June 1905 .	Kerosine .	Shidhi, Noakhali .	The Magistrate reported that a native lad allowed a lamp to drop into a tin of kerosine oil with the result that the tin of oil caught fire. The father of the lad tried to take the tin out of the house, but it slipped out of his hands and he was burnt so severely that he died. His son and wife came to his assistance and also received injuries from the burning oil.	1	2
37	29th June 1905 .	Petrol . .	Calcutta . .	The Commissioner of Police reported that about 8-30 P.M. an explosion of petrol took place in the petrol godown of Messrs. Walter Locke & Co. at No. 4, Esplanade East, and is attributed to a leak in one of the drums containing petrol through which the vapour must have escaped and travelled into an adjoining room where there was an enamelling stove which was alight at the time of the explosion and the vapour must have caught fire at it and travelled back to the drum and burst it. There were at the time 25 2-gallon drums in the godown, 18 of which contained petrol but none of these caught fire.	...	...
38	11th July 1905 .	Crude Petroleum	Yenangyaung, Burma.	A slight explosion occurred in one of the Burma Oil Co.'s tanks at about 11-45 P.M. The tank was 19' 6" high and 32' 6" in diameter and had a capacity of 100,000 gallons. At the time of the explosion there was about 17 feet of oil in the tank. There were other tanks containing oil in the vicinity. Oil was run daily from the oil fields into these tanks, and a dip is taken hourly in the day time between 6 A.M. and 6 P.M. while from 6 P.M. and 6 A.M. the tank is hourly visited to see that the oil does not overflow. The man, who died from the injuries caused by the explosion, confessed to his having taken a light to the top of the tank to see how much oil was in it. The damage done was very slight, being estimated at about Rs. 25. One or two of the plates on one side of the tank were buckled and the roof slightly crumpled.	1	...
39	7th Sep. 1905 .	Petrol . .	Bombay Harbour .	The Commissioner of Police reported that a cargo of dangerous petroleum had been unloaded into 4 cargo boats and was being conveyed to the storage building on shore. One of these having loaded about 1,600 drums left for Ismail Habib Bunder about 5-30 P.M. and the tindal of the boat reported that shortly after he heard a noise of something leaking. The lights were lit at about 6-30 P.M. and about 7 P.M. a heavy dull explosion was heard and the boat at once burst into flames and began to drift towards the steamers and craft lying at anchor. The Port Trust tug boat came to the rescue, but finding it impossible to take the boat in tow it was decided to ram her, which proved successful. Patches of burning oil drifted slowly with the tide and the work of extinguising the flames as far as this was possible was begun and by 10 P.M. no trace of floating flames remained. The seven men who were on board jumped over board but two of them were burnt. Two other boats took fire, one of which had 1,011 drums and the other 1,200 drums of dangerous petroleum but both having stuck in the mud on account of low tide, and as nothing	...	2

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
				Petroleum—*concld.*		
				could be done to save them, they were allowed to burn down. The three barges took fire about the same time although there was no connection between the fire on the first barge and that on Nos. 2 and 3. No. 1 was distant at the time some two miles from the others. No. 3 presumably took fire from No. 2 which was only about 12 yards distant to windward. The hour at which the fires occurred is that at which crews generally cook their food and presumably the cause of the fire can be attributed to the petrol vapour catching fire from lights, as the drums were said to be leaking. The drums were all 4-gallon drums.		
40	5th Nov. 1905	Petrol	Jackeria Bunder Bombay Harbour.	An iron barge containing about 2,000 drums was conveying them to the Bunder to land them. Owing to an adverse tide the barge did not get to the Bunder till dark and so had to anchor there as by the Customs Rules no petrol is allowed to be landed after dark. Two of the crew went ashore at about 6 P.M. to cook food and returned with the cooked food at about 6-30 P.M. Whilst the crew were eating their food on the front part of the barge a slight explosion took place and the barge was enveloped in flames. The crew jumped over board but the Tindal of the boat got slightly burnt. There is no doubt that the accident must have been caused by some one either striking or bringing a light on or near the barge.	...	1
41	18th Sep. 1905	Petroleum	On *S. S. Oriental* at Rangoon.	From the Magistrate's enquiry it appears that while the steamer was going from Duneedaw to Syriam, a Khalasi struck a light in the ballast hold in the forepart of the steamer where a tin of kerosine oil had been irregularly and presumably dishonestly placed by some person. Vapour had evidently been given off from this oil and accumulated in the confined place of the hold and the mixture of air and vapour exploded when the light was struck and the man died in consequence of the injuries received.	1	...
42	9th Nov 1905	Petroleum	Yenanyaung	A gusher well No. 160 belonging to the Burmah Oil Co. and situated on the brow of a hill caught fire. The fire was caused by lights being used in a Burman's hut about 100 feet away from the well on the downward slope. The gas from the well travelled down to the hut, got lighted there, and the flames flashed back to the well and also set the hut on fire. Four Burmans in the hut were burnt. The fire was put out after some considerable time. The Burma Oil Co. sufferred a loss of about Rs. 7,500.	...	4
43	13th Nov. 1905	Petroleum	Bombay	About 8 o'clock in the evening a fire was discovered in the Port Trust petroleum godown in which were stored paint, benzine, naptha, laughing gas and phosphorus. The cause of the fire was attributed to spontaneous ignition of the phosphorus. The godown was destroyed by the fire.	...	...
44	31st Dec. 1905	Crude earth oil	Rangoon	The Magistrate reported that 3 coolies were engaged in refilling an oil storage tank, the oil being used for the furnace in the bolt machine shop. The men finding the oil congealed and thick, stirred it with a red hot iron bar, when flames burst forth suddenly injuring the men, one of whom died from the effects.	1	2
				TOTAL	7	13

Summary of accidents during the year 1905.

Explosive or dangerous and inflammable substance.	Accidents causing loss of life and bodily injury.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons			
		Killed.	Injured.		
EXPLOSIVES.					
Gunpowder	6	6	3	1	7
Dynamite	10	6	19	...	10
Ammunition	...	...	...	...	...
Fireworks	15	13	26	...	15
TOTAL	31	25	48	1	32
PETROLEUM.					
Petroleum generally	9	7	13	3	12
TOTAL	9	7	13	3	12
CHEMICALS.	...	...	...	...	...
TOTAL	...	...	...	...	...
MISCELLANEOUS.	...	...	...	...	...
TOTAL	...	...	...	...	...
GRAND TOTAL	40	32	61	4	44

ENDIX F.

Detailed statement showing the number of accidents and persons killed and injured during the six years 1900 to 1905.

Year.	Gunpowder.			Dynamite and other nitro-compound blasting explosives.			Ammunition.			Fireworks.		
	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No.o accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.
1900 . .	5	22	5	3	...	4	...	...	...	8	4	9
1901 . .	9	8	10	7	3	14	...	...	...	12	12	18
1902 . .	10	8	8	2	1	4	...	...	...	25	22	40
1903 . .	5	9	1	7	5	18	...	...	...	20	8	26
1904 . .	11	25	30	5	3	10	1	...	1	13	10	9
1905 . .	7	6	3	10	6	19	...	...	...	15	13	26
Total .	47	78	57	34	18	6	1	...	1	93	69	128
Average .	8	13	9	6	3	11	1	...	1	15	11	21

Year.	Petroleum.			Chemicals.			Miscellaneous.		
	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.
1900 . .	3	14	...	6	1	11	...	...	...
1901 . .	6	21	3	4	1	1	...	...	...
1902 . .	3	7	1	5	2	2	2	4	...
1903 . .	9	13	14	2	6	3	...	...	...
1904 . .	8	42	10	4	...	9	5	...	1
1905 . .	12	7	13	...	...	...	...	...	...
Total .	41	104	41	21	10	26	7	4	1
Average .	7	17	7	4	2	4	1	1	...

APPENDIX G.

Comparative Statement showing the number of accidents and persons killed and injured during the six years 1900 to 1905.

Year.	Accidents causing loss of life or bodily injury.			Accident not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons			
		Killed.	Injured.		
1900	23	41	29	2	25
1901	32	45	46	6	38
1902	42	44	55	5	47
1903	35	41	62	8	43
1904	40	80	70	7	47
1905	40	32	61	4	44
Total	212	283	323	32	244
Average	35	47	54	5	41

APPENDIX H.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1905 to 31st December 1905.

No.	Date of accident.	Nature of Explosives.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of Persons	
					Killed.	Injured.
Government Accidents.						
1	11th April 1905	6·3-inch Howitzer Common Shell.	Quetta Arsenal .	The Ordnance Officer, Quetta Arsenal, reported that three 6·3-inch Howitzer Common Shell were being emptied, one had the primer extracted and charge wetted, the other two were having the primers extracted and a Sergeant was taking out the primer from one of them with a Hook G. S. Wad when the explosion occurred. The powder in the two shells had not been wetted as the wetting is done after the primer is removed. The accident was supposed to have been caused by some grit getting in the primer, and that the Hook G. S. Wad tearing the shaloon (which may have perished) as the primer was being extracted, and passing rapidly through the dry powder, the grit ignited the same. A Board of Enquiry was held and were of opinion that the primers of shells used by Heavy Ordnance should be damped before they are extracted from the shells.	5	1
2	20th August 1905.	Powder charge .	Rangoon . .	The Officer Commanding the Rangoon Brigade reported that when a gunner was preparing to fire the Time Gun on the night of the 20th August, the charge exploded seriously injuring the gunner. From the evidence it appeared that some broken glass was found in the bore of the gun which caused the explosion when the charge was being rammed. It was believed that the glass was placed in the bore by some malicious person who remained undiscovered.	...	1
3	12th December 1905.	Cap composition	Dum-Dum . .	The Superintendent, Ammunition Factory reported that, while a native was destroying unserviceable caps, the composition exploded injuring him.	...	1
				TOTAL .	5	3

APPENDIX I.

Statement showing the import of explosives by sea into British India from other countries in the year 1905.

	Imports in 1905.					
	Bengal.	Bombay.	Sind.	Madras.	Burma.	Total.
Quantity.						
Gunpowder, black . . . . lbs.	66,351	83,000	6,250	40,850	6,300	202,751
Gunpowder, smokeless . . . „	10,200	10,450	22,975½	1,250	250	45,125½
Dynamite . . . . . „	79,968	40,000	20,000	30,000	80,000	249,968
Blasting Gelatine . . . . „	...	...	...	557,700	500	558,200
Gelignite or Gelatine Dynamite . „	20,048	6,000	...	97,000	...	123,048
Other nitro-compound explosives . „	49,392	60,083	...	...	...	109,475
Detonators . . . . . No.	...	120,000	150,000	1,455,000	72,000	1,797,000
Fireworks . . . . . lbs.	...	1,484,690	8,429	149,919	18,191	1,661,229
Total . lbs.	225,959	1,684,223	57,654½	876,719	105,241	2,949,796½
Total . No.	...	120,000	150,000	1,455,000	72,000	1,797,000
Value in Rupees.						
Gunpowder, black	54,529	35,142	1,906	20,463	7,765	1,19,805
Gunpowder, smokeless . . .	31,231	21,020	37,353	4,135	925	94,664
Dynamite	64,687	31,790	15,922	23,146	60,000	1,95,545
Blasting Gelatine	...	...	...	5,26,528	595	5,27,123
Gelignite or Gelatine Dynamite .	16,171	4,770	...	76,880	...	97,821
Other nitro-compound explosives .	26,621	30,717	...	...	...	57,338
Detonators	9,383	2,026	2,826	28,290	755	43,280
Fireworks	24,327	3,31,388	4,378	19,897	9,053	3,89,043
Total . Rs.	2,26,949	4,56,853	62,385	6,99,339	79,093	15,24,619

APPENDIX J.

Comparative Statement showing the import of explosives by sea into British India from other countries during the five years 1901 to 1905.

		1901.	1902.	1903.	1904.	1905.
Gunpowder, black	lbs.	178 259	211,035	272,423	473,925	202,751
Gunpowder, smokeless	„	17,379	26,605	31,004	48,246	45,125½
Dynamite	„	355,080	189,896	416,480	149,968	249,968
Blasting Gelatine	„	610,000	725,000	843,432	895,040	558,200
Gelignite or Gelatine Dynamite	„	61,950	50,000	22,096	55,048	123,048
Other nitro-compound explosives	„	125,529	107,071	222,104	130,811	109,475
Detonators	No.	2,679,000	3,297,509	4,388,400	3,020,000	1,797,000
Fireworks	lbs.	833,268	1,147,223	1,971,317½	2,264,162	1,661,229
TOTAL	lbs.	2,181,465	2,456,830	3,778,856½	4,017,200	2,949,796½
TOTAL	No.	2,679,000	3,297,509	4,388,400	3,020,000	1,797,000

APPENDIX K.

Statement showing the quantity of dangerous and non-dangerous petroleum imported by sea into British India during the year 1905.

	Dangerous.	Non-dangerous.	
	Gallons.	Gallons.	
Chittagong	.....	3,970,269	
Balasore	.....	10,000	
Chandbali	.....	367,500	
Calcutta	14,500	27,144,014	
Bombay	66,017*	22,099,928	* Includes composition paint and rubber solution.
Sind	622	5,157,947	
Madras	7,828	9,765,384	
Burma	5	1,595,209	
TOTAL	88,972	70,110,251	

Statement showing the quantity of dangerous and non-dangerous petroleum produced in Assam and Burma during the year 1905.

	Dangerous.	Non-dangerous.	
	Gallons.	Gallons.	
Assam	21,014	1,543,212	
Burma	11,988,220	67,062,170*	* Refined petroleum.
TOTAL	12,009,234	68,605,382	

APPENDIX L.

Statement showing the quantity of petroleum produced by the petroleum producing countries during the three years 1903 to 1905.

	1903.	1904.	1905.
	In tons.	In tons.	In tons.
America	12,557,000	15,000,000	17,000,000
Russia	10,320,000	10,600,000	6 500,000
Sumatra, Java and Borneo	830,000	1,000,000	1,200,000
Galicia	713,800	827,000	800,000
Roumania	384,300	455,000	568,000
India	325,400	404,000	465,000
Other countries	250,000	250,000	350,000
TOTAL	25,380,500	28,536,000	26,883,000

APPENDIX M.

No. 4694—3-12.

GOVERNMENT OF INDIA.

DEPARTMENT OF COMMERCE AND INDUSTRY.

NOTIFICATION.

EXPLOSIVES.

Simla, the 4th September 1905.

The Governor General in Council is pleased, in exercise of the powers conferred by sections 5 and 7 of the Indian Explosives Act, 1884 (IV of 1884), to make the following amendments in the rules to regulate the transport and importation of explosives published by the notification in the Home Department No. 5528, dated the 11th October 1901, as amended by notifications in the Home Department No. 620-Public, dated the 21st February 1902, and No. 2346-Public, dated the 11th June 1903.

AMENDMENTS.

I.—In rule 1, Class 6, *Ammunition class, after* the words "Division 1 comprises exclusively—safety cartridges, safety fuzes for blasting" *omit* the words—"Fuzes for shells, and tubes friction for guns, provided there be no more than five fuzes or 25 tubes in one package, and that the package be a hermetically sealed metal cylinder."

II.—For rule 2 *substitute* the following, namely:

"2. The following general rules shall be observed with respect to the packing of explosives for conveyance:

(1) Unless the context otherwise requires,—

the expression "outer package" means a box, barrel, case or cylinder, of wood, metal, or other solid material, of such strength, construction and character that it will not be broken or accidentally opened, nor become defective or insecure whilst being conveyed, and will not allow any explosive to escape;

the expression "inner package" means a substantial case, bag, canister, or other receptacle, made and closed so as to prevent any explosive from escaping;

the expression "authorized explosive" means exclusively an explosive included in a List of Authorized Explosives prepared by the Chief Inspector of Explosives with the Government of India, and published annually in the *Gazette of India*, and in force for the time being;

the expression "propellant" means an authorized explosive of Class 3, adapted and intended exclusively for use as a propelling charge in cannon or small arms; and

the expression "special authority" means a written authority granted by the Chief Inspector of Explosives, to which may be attached such conditions as may, in the opinion of the Chief Inspector of Explosives, be necessary to meet the special requirements of the case.

(2) The interior of every package shall be free from grit and otherwise clean.

(3) Save as hereinafter provided, there shall not be any iron or steel in the construction of any package unless the same is covered with suitable material so as effectually to prevent the exposure of such iron or steel.

(4) Every package when actually used for the packing of one explosive shall not be used for the packing of any other explosive or any other article or substance:

Provided that this rule shall not prevent the packing of inner packages containing a propellant in an outer package with inner packages containing gunpowder or another propellant:

Provided also that this shall not prevent the packing of any article which is not of an inflammable or explosive nature or liable to cause fire or explosion, in the same package as an explosive of the 1st Division of the 6th (Ammunition) Class.

(5) Subject to the foregoing provisions, the following shall be the method of packing authorized explosives of the various classes, respectively, and the maximum amounts which may be in any one package:

Class.	Method of packing.	Amount in any one outer package.	Amount in any one inner package.
Class 1	When the quantity in any one consignment does not exceed 5lbs. in amount, a single outer package; otherwise A double package, the inner and outer packages being as above defined.	100 lbs. Provided that where gunpowder and propellant are packed together the amount shall not exceed— 50 lbs.	100 lbs. 25 lbs.
Class 2	As for Class 1	50 lbs.	50 lbs.
Class 3, Division 1, other than propellants.	As for Class 1, provided that either the outer or inner package shall be thoroughly waterproof, and both shall be without metal in the construction thereof.	50 lbs.	5 lbs.
Class 3, Division 1, propellants.	As for Class 1	50 lbs.	50 lbs.
Class 3, Division 2, other than Picric Acid and Wet Guncotton.	As for Class 1	50 lbs.	50 lbs.
Picric Acid . .	As for Class 1	Unlimited.	Unlimited.
Guncotton so wetted with water as to be absolutely uninflammable.	As for Class 1, provided that the inner or outer package, or both of them, shall be of such a nature, and so closed, as to prevent any material loss of moisture during conveyance.	Unlimited.	Unlimited.
Class 4	As for Class 1	50 lbs.	50 lbs.
Class 5	Packed in water. A treble package, the innermost package being a bag permeable to water, enclosed in a case containing sufficient water to ensure the explosive being kept constantly wet; and the outer package containing sufficient water constantly to surround the case. Both the case and the outer package shall be of such construction as will not allow water to escape. If the explosive is of such character that it cannot be packed in a thoroughly wet condition, it shall be packed in accordance with conditions set forth in a special authority.	200 lbs.	25 lbs.
Class 6, Division 1, other than Pin-fire cartridges for pistols.	A single outer package: Provided that the above general rule (3) shall not apply to explosives of this Division. Provided also that bulleted cartridges of a calibre exceeding 0·5 inch and belonging to this Division shall be packed in such a manner that the point of any bullet cannot come in contact with the cap of another cartridge.	Unlimited.	.....
Pin-fire cartridges for pistols.	(*a*) Not exceeding 50 in number in any one consignment:—So packed in a single package that the bases lie alternately in opposite directions. The bases and pins shall be so fitted into perforations in millboard or other suitable material as to prevent the firing of any one of the said cartridges by an explosion in any other of the said cartridges.	50 in number.	.....
	(*b*) Exceeding 50 in number:—In an inner and outer package the cartridges being packed in inner packages with millboard as above required.	2,500 in number	50 in number.

Class.	Method of packing.	Amount in any one outer package.	Amount in any one inner package.
Class 6, Division 2 . .	Explosives made up into cartridges or charges for cannon, shells, torpedoes, mines, blasting or other like purposes, shall be packed in such manner and in such quantity as is required for the same explosive when not so made up; provided that where a double package is required, the enclosing case of such cartridges or charges may, if it satisfies the conditions required for an inner package, be held to be such inner package.	.....	.....
	Other ammunition of this Division:—A single outer package.	100 lbs. . .	.....
Class 6, Division 3, other than Detonators and Electric Detonators.	As for Class 1	50 lbs. . . .	2 lbs. or 10 in number, whichever be the greater.
	Provided that bulleted cartridges of a calibre exceeding 0·5 inch and belonging to this Division shall be packed in such a manner that the point of any bullet cannot come in contact with the cap of another cartridge.		
Detonators . . .	(*a*) Not exceeding 1,000 in any one consignment:—As for Class 1, provided that the detonators and the spaces between the same and between the sides of the inner package and the said detonators shall all be filled, as far as practicable, with fine sawdust or other similar material; a layer of felt or other soft yielding material shall be placed between both ends of all the detonators and the interior of the inner package in which the same are placed, in such manner, and so secured, that both ends of the detonators will rest upon the said cotton wool or other material; every inner package, if of metal, to be lined throughout with paper or other soft material; and	1,000 in number	100 in number.
	(*b*) Exceeding 1,000 detonators:		
	The detonators shall be packed in inner packages, with sawdust and cotton wool as above described. Such inner packages shall be placed inside a substantial case of wood or metal, made and closed so as to prevent any of the inner packages escaping therefrom, and such case shall be placed inside an outer package in such manner and so secured as to leave a clear space of not less than three inches between the case and every part of the interior of the said outer package, notwithstanding that such clear space may, if preferred, be filled with sawdust, straw, or other similar material, or may contain a light framework or battens of wood to keep the case aforesaid in position in the outer package; and	10,000 in number	100 in number.
	(*c*) where the number of detonators exceeds 5,000, such outer package shall be provided with handles or other contrivance by means of which it can be safely and conveniently carried.		
Electric Detonators. .	As for Class 1, provided that where the number in any outer package exceeds 3,000, such outer package shall be provided with handles or other contrivance, by means of which it can be safely and conveniently carried.	5,000 in number.	100 in number.
Class 7, Division 1 . .	Double package, the inner package being hermetically closed, and contained in an outer package as above defined.	20 lbs. . .	1 lb.
Class 7, Division 2 . .	Single outer package, provided that the above general rule (3) shall not apply to explosives of this Division.	100 lbs. . .	.....

(6) Nothing in this rule shall be deemed to prohibit the use of an additional package, whether inner or outer, provided that such additional package shall not be of such character as shall have been prohibited in writing by the Chief Inspector of Explosives.

(7) An explosive which is not an authorized explosive shall be packed in such manner as may be directed by a special authority with reference to such explosive.

(8) On the outermost package there shall be affixed in conspicuous characters, by means of a brand or securely attached label or other mark, the word "Explosive," the name of the explosive, the number of the class and division to which it belongs, and the name of the manufacturer or sender.

In the case of explosives of Classes 3 and 4, there shall be added the date of manufacture or issue from the factory, or such sign indicating such date as may be approved by the Chief Inspector of Explosives.

Provided that in the case of cartridges or charges for cannon, shells, mines, blasting or other like purpose, which do not contain their own means of ignition, the marking shall be as for the explosive when not so made up.

Provided also that in the case of explosives of Class 6, Division I (Safety Fuzes excepted), there shall be added the words "Not liable to explode in bulk."

Provided also that in the case of Pin-fire cartridges for pistols there shall be added the words "Pin-fire cartridges."

Provided also that in the case of Safety Fuzes or Gunpowder the word "Explosive" and the number of the class and division may be omitted.

Provided also that, where an outer package contains more than one explosive, the marking above required shall be affixed separately in respect of each explosive so contained.

(9) To meet special cases, exemption may be granted by special authority from the observance of any one or more of the conditions imposed by this rule."

W. L. HARVEY,
Secretary to the Government of India.

APPENDIX N.

DEPARTMENT OF EXPLOSIVES.

NOTIFICATION.

Dated Calcutta, the 12th March 1906.

No. 353.—With reference to the Commerce and Industry Department Notification No. 4694-3-12, dated the 4th September 1905, publishing amendments made in the rules to regulate the transport and importation of explosives, published with the like Notification No. 5528, dated the 11th October 1901, the following list of "authorized explosives" referred to in rule 2 (1) of the above rules is published for general information:—

LIST OF AUTHORIZED EXPLOSIVES.

The following explosives are at present authorized for importation into British India for general sale:—

Class 1.—GUNPOWDER.

GUNPOWDER.

Class 2.—NITRATE MIXTURE.

RIPPLENE.

Class 3.—NITRO-COMPOUND.

Every explosive in this class and every explosive ingredient thereof shall be so thoroughly purified and otherwise of such character as to satisfy a test known as the heat test, and specified in Schedule A of Home Department Notification No. 5529-Public, dated the 11th October 1901.

Division 1.

ALBIONITE.
AMBERITE NO. 1.
BALLISTITE.
BLASTING GELATINE.
CARBONITE.
CELTITE.
CORDITE.
CORDITE, M. D.
DYNAMITE.
GELATINE DYNAMITE NO. 1.
GELATINE DYNAMITE NO. 2, OR GELIGNITE.
PHŒNIX POWDER.

Provided that every explosive in this division shall be of such character and consistency as not to be liable to liquefaction or exudation.

Division 2.

AMBERITE NO. 2.
AMMONITE.
COOPPAL'S POWDER.
E. C. SPORTING POWDER.
EMPIRE POWDER.
GUNCOTTON.
HENRITE
SCHULTZE GUNPOWDER.
KYNOCH'S SMOKELESS SPORTING POWDER.
NEGRO POWDER.
PICRIC ACID.

PICRIC POWDER.
RIFLEITE.
ROBURITE.
S. R. POWDER.
S. S. POWDER.
SMOKELESS POWDER.
SMOKELESS BLASTING POWDER.

Class 4.—CHLORATE MIXTURE.

Nil.

Class 5.—FULMINATE.

Nil.

Class 6.—AMMUNITION.

Division 1.

SAFETY FUZES FOR BLASTING.
SAFETY ELECTRIC FUZES.
PERCUSSION CAPS.
RAILWAY FOG SIGNALS.
SAFETY CARTRIDGES.

Division 2.

CARTRIDGES FOR CANNON, SHELLS, MINES, BLASTING OR OTHER LIKE PURPOSES.
CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.
ELECTRIC FUZES.
FUZES FOR BLASTING WHICH ARE NOT SAFETY FUZES.
FUZES FOR SHELLS.
TUBES FOR FIRING EXPLOSIVES.
WAR ROCKETS.

Division 3.

CARTRIDGES FOR SMALL ARMS, WHICH ARE NOT SAFETY CARTRIDGES.
DETONATORS.
ELECTRIC DETONATORS.
FUZES FOR BLASTING WHICH ARE NOT SAFETY FUZES.
FRICTION TUBES.
FUZES FOR SHELLS.
TUBES FOR FIRING EXPLOSIVES.

Class 7.—FIREWORK.

Division 1.

Nil.

Division 2.—Manufactured Fireworks.

MANUFACTURED FIREWORKS.
AMORCES.
CHINESE CRACKERS.

C. A. MUSPRATT-WILLIAMS, Major, R.A.,
Chief Inspector of Explosives in India.

APPENDIX O.

No. 244-20.

GOVERNMENT OF INDIA.

DEPARTMENT OF COMMERCE AND INDUSTRY.

Calcutta, the 12th January 1906.

NOTIFICATION.

EXPLOSIVES.

In exercise of the powers conferred by section 5 of the Indian Explosives Act, 1884 (IV of 1884), the Governor-General in Council is pleased to direct that the following sub-rule shall be added to rule 5 of the rules regulating the transport and importation of explosives, published in the Notification of the Government of India in the Home Department, No. 5528, dated the 11th October 1901 :—

Sub-Rule.

"111.—No explosive belonging to class 1 (gunpowder class), class 2 (nitrate-mixture class), class 3 (nitro-compound class), class 4 (chlorate-mixture class) or class 5 (fulminate class), shall be carried otherwise than by rail, across any railway bridge over which reasonable facilities for the conveyance thereof by rail are afforded by the Railway Administration."

"Provided that this prohibition shall not apply in respect of quantities of explosives of class 1 (gunpowder class) or class 3 (nitro-compound class) not exceeding 5 lbs. in weight."

W. L. HARVEY,
Secretary to the Government of India.

APPENDIX P.

No. 5484-4-10.

GOVERNMENT OF INDIA.

DEPARTMENT OF COMMERCE AND INDUSTRY.

NOTIFICATION.

EXPLOSIVES.

Simla, the 2nd October 1915.

In exercise of the powers conferred by section 17 of the Indian Explosives Act, 1884 (IV of 1884), and in supersession of Government of India, Home Department, Notification No. 1606-Public, dated the 31st July 1897, the Governor General in Council is pleased hereby to declare that,—

I.—Picric acid when in process of manufacture shall (for whatever purpose used or manufactured) be deemed to be an explosive within the meaning of the said Act, subject to the following exception :

(*a*) When the picric acid is mixed with not less than half its own weight of moisture in every process of manufacture, it shall be exempt from being deemed to be an explosive within the meaning of the said Act.

II.—Picric acid when kept, conveyed, imported or sold shall (for whatever purpose used or manufactured) be deemed to be an explosive within the meaning of the said Act, subject to the following exceptions:

(*a*) Picric acid mixed with not less than half its own weight of water shall be exempt from being deemed to be an explosive within the meaning of the said Act.

(*b*) Picric acid which does not fall within the exemption (*a*), when the quantity does not exceed two thousand pounds in any one ship, boat, carriage, building or place, shall be exempt from being deemed to be an explosive within the meaning of the said Act ; provided that such picric acid is so kept and conveyed as not to be liable, whether under the action of fire or otherwise, to come in contact with any substance specified in the schedule hereto, or with any fire or light capable of igniting such picric acid.

Provided also that such picric acid when dry is so packed in a substantial barrel or case that the contents cannot escape; and that no metal other than aluminium, or an alloy containing not less than ninety per centum of aluminium, is used in the construction of any package containing such picric acid, and that each barrel or case is legibly marked "Picric Acid."

Picric acid when not subject to the above exemptions must be packed and marked as laid down in the rules* relating to the packing of explosives prescribed by the Government of India.

* General Rules for Transport and Importation of Explosives.

III.—Picrates and mixture of picric acid with any other substance (for whatever purpose used or manufactured) shall be deemed to be explosives within the meaning of the said Act, subject to the following exception ;

(*a*) A picrate mixed with not less than half its own weight of water shall be exempt from being deemed to be an explosive within the meaning of the said Act.

SCHEDULE.

Any of the following metals or metalic oxides, namely, lead, oxide of lead, oxide of iron, potash, baryta, lime, soda, oxide of zinc, oxide of copper ; and any compound of such metal or oxide (other than a metalic sulphate) ; or any chlorate, nitrate, or other oxidizing agent ; or any other substance declared by a Notification of the Government of India to be capable of forming with picric acid a dangerous compound.

Provided that this schedule shall not be deemed to include any metal, or oxide unavoidably formed on any metal, used in the construction of any ship. boat or carriage, or contained in any paint, where the packages containing picric acid are protected from direct contact with such metal or paint.

W. L. HARVEY,
Secretary to the Government of India.

APPENDIX Q.

[Enclosure to the Railway Board's Circular No. R. T. 173, dated the 30th August 1905.]

Amendments in rule 14, of Part II and in Appendix B of the General Rules for working open lines of railway, which were promulgated with the Government of India, Public Works Department Circular No. 6 Ry., dated the 12th March 1895.

From rule 14, Chapter III, Part II, *expunge* the item "Gas, compressed, other than liquid carbonic acid gas secured in wrought iron cylinders or solid drawn steel flasks without seam or join, certified by competent authority to withstand a pressure of 250 atmospheres (3,750 lbs.)_____D" and *substitute* the following :—

Gas, compressed, *viz.*:..... G. Compressed Oxygen. Compressed or liquefied Carbonic Acid Gas (Carbon Dioxide). Compressed Coal Gas. Compressed Hydrogen. Liquefied Anhydrous Ammonia or Compressed Ammonia Gas. Liquefied or Compressed Nitrous Oxide. Liquefied or Compressed Sulphurous Acid Gas (Sulphur Dioxide).	1. These gases must be packed in cylinders. 2. Cylinders must be made of wrought iron or mild steel of the best quality, containing not more than 0·25 per cent. of carbon thoroughly annealed after manufacture, of sufficient strength and efficiently tested and must not exceed 8 feet in length and 10 inches in diameter. 3. Cylinders must be separately and securely packed in a strong wooden case, or in a covering made of closely plaited 1 inch (circumference) hemp or coir; except that several small cylinders not exceeding 18 inches in length and 4 inches in diameter may be packed in one box provided each cylinder is contained in a separate compartment or is separately encased in closely plaited 1 inch (circumference) hemp or coir. Each box must not contain more than 25 cylinders and the gross weight of each box and contents must not exceed $3\frac{1}{2}$ maunds. 4. Cylinders containing Atmospheric Air, Coal Gas, Hydrogen or Oxygen, must not be charged to a greater pressure than 1,800 lbs. per square inch. 5. No cylinder may contain, per pound of water capacity more than $\frac{3}{4}$lb. of Carbon Dioxide (Carbon Acid Gas); $\frac{1}{2}$lb. of Anhydrous Ammonia, $\frac{3}{4}$lb. of Nitrous Oxide; or $1\frac{1}{4}$lbs. of Sulphur Dioxide (Sulphurous Acid Gas) respectively. 6. Cylinders must be carefully handled, and must not be exposed to the rays of the sun, nor to the heat of a fire, stove or other source of heat.

[*Enclosure to the Railway Board's Circular No. R. T.* $\frac{2624}{6}$, *dated the 12th March 1906.*]

In rule 14, Chapter III, Part II, as amended by the Railway Board's circular No. R. T. 173, dated the 30th August 1905, *add* the following as condition No. 7 :—

7. No consignment of goods marked G in Rule 14 shall be accepted for carriage by rail unless the consignor has signed a certificate in the following form.

FORM OF CERTIFICATE.

CERTIFIED that the cylinder or cylinders containing_____ tendered by $\frac{\text{me}}{\text{us}}$ as per Forwarding No. _____ of this date to the_____railway for despatch to_____station $\frac{\text{has}}{\text{have}}$ been packed and tested in accordance, and that the cylinder or cylinders $\frac{\text{complies}}{\text{comply}}$ in every respect with the rules promulgated under the Railway Board's Circular No. R. T. 173, dated the 30th August 1905, to regulate the packing and carriage by railway in India of_____.

$\frac{\text{I}}{\text{we}}$ also certify that the consignment complies with the conditions that the cylinder or cylinders must be of wrought iron or mild steel of the best quality containing not more than 0·25 per cent. of carbon, thoroughly annealed after manufacture, of sufficient strength and efficiently tested.

Signature of $\frac{\text{sender}}{\text{senders}}$

Eighth Annual Report of the Chief Inspector of Explosives, India.

No. 732.

FROM

MAJOR C. A. MUSPRATT-WILLIAMS, R. A.,

Chief Inspector of Explosives in India,

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,
DEPARTMENT OF COMMERCE AND INDUSTRY.

Calcutta, the 20th May 1907.

SIR,

I have the honour to submit herewith a report of the work of my Department for the year ending 31st March 1907.

Personnel.

2. On the 13th December 1906 Honorary Lieutenant J. S. Rush, who had been an Assistant Commissary in the Government Cordite Factory at Aruvankad, was appointed Inspector of Explosives on probation for three years in place of Honorary Lieutenant J. W. Turner, who had been officiating in the appointment for one year, till Mr. Rush's services could be spared. Mr. Turner did most excellent service under me and was admirably suited to the appointment, and I was consequently sorry to lose his services.

Number of magazines.

3. During the year 1906, 120 licenses (or twelve more than in the previous year) were granted in British India under Rule 17 of the rules to regulate the manufacture, possession and sale of explosives. The number of magazines licensed was 169, or fifteen more than in 1905, and is in excess of the number of licenses granted, because in a number of cases firms have two or more magazines in one place under one license. A statement showing the number and location of the magazines and also the number of licenses granted in British India is given in Appendix A. It will be seen from this statement how widely dispersed these magazines are, and how in some cases they are situated in places very difficult of access, and consequently considerable time has to be spent in getting from place to place, which necessarily, to a certain extent, curtails the number of inspections that can be made during the year.

Inspection of explosives magazines during the year.

4. During the year 235 inspections of magazines were made, a number of magazines being inspected two or three times each. Those magazines are inspected most frequently, which are situated in the neighbourhood of towns or in populous localities, or which contain large quantities of explosives, or any explosive, which, on account of greater susceptibility to decomposition and consequent ignition, it is considered advisable to examine and test more than other explosives. The Roburite Factory at Karachi was also inspected twice. In addition to these inspections a number of registered premises were also visited. Less inspections of explosives magazines have been made in 1905 and 1906 than in the years 1902, 1903 and 1904, but this is due chiefly to the fact that during the last two years considerable additional inspection work in connection with petroleum has been carried out by this

Department. As also most of the small magazines in the coal districts of Bengal and elsewhere have now been brought to a satisfactory condition, I have not considered it necessary to have them inspected more than once a year, more especially as the large feeder magazines, which supply them, are inspected two or three times a year. In paragraph 11 of my Annual Report for the year ending 31st March 1905, I brought to notice the unsatisfactory and dangerous state of many of the minor petroleum installations near Railway stations, and I have therefore thought it advisable since then to devote considerable attention to petroleum inspection work and to get these installations in order as soon as possible. After considerable experience in my present appointment I am able to say that till an inspection of an explosives magazine or a petroleum installation has been made by this Department, it is quite unusual to find the rules or conditions of a license either observed or enforced. Cases also have occurred where petroleum installations have been in existence without any license, till the matter was brought to notice by this Department.

Condition of magazines.

5. The magazines generally are in good order, and, as usual, I have found magazine owners most willing to carry out my recommendations even when involving considerable expense, and my thanks are due to them for making my duties easy in this respect.

Condition of explosives in magazines.

6. The physical condition of all the explosives in the different magazines during the year was found to be good with the exception of about 2,450 pounds of Blasting Gelatine and 200 pounds of Gelatine Dynamite, both of German manufacture, stored in a large magazine in the Bengal Coal District, which were found to be somewhat soft and showing signs of exudation. As these explosives had been in the magazine just over three years from date of importation and were showing signs of deterioration, I did not consider it advisable that they should be subjected to another hot-weather's storage, and refused to give the necessary certificate for a further period of storage, which is required by conditions 14(1) and 14(2) of a license (Form J) granted under rule 17 of the rules for the manufacture, possession and sale of explosives, and informed the District Magistrate concerned that the explosives should be destroyed by the 15th March 1907. The destruction was carried out by the Agents of the German Company in accordance with simple instructions for the destruction of explosives, compiled by this Department, which were issued to them. Copies of these instructions, which are given in Appendix K of my sixth Annual Report, can always be obtained on application to this Department.

Thefts.

7. No thefts of explosives were reported to this Department during the year.

Number of petroleum installations.

8. During the year under report, 331 licenses for the storage of non-dangerous petroleum with which this Department has been concerned or consulted were granted. A list of these installations, corrected up to date, and showing the districts in which they are located, is given in Appendix B. In addition, of course, there are a very large number of storage godowns for the possession of non-dangerous petroleum in non-bulk, licensed by District Officers, of which this Department has no cognizance.

Inspection of petroleum installations during the year.

9. During the year I personally visited the large bulk oil installations at Madras, Karachi, Calcutta (Budge Budge and Narculdanga), Chittagong and Rangoon, and also the oil fields and refineries in Assam and Burma, and a large number of the minor installations were also inspected by the Inspector of Explosives and myself. In all 296 petroleum inspections were made. In Burma the refineries of the Burma Oil Company are at Duneedaw, a suburb of Rangoon, and at Syriam in the Hanthawaddy District, some few miles from Rangoon, and on the opposite side of the Pegu river. At both these places, there are also storage tanks and also at Kyaukchaung, which is opposite Syriam and connected with it by an oil pipe under the Pegu river. At present the oil is brought down in iron oil flats from the oil fields, which are situated at Yenangyaung, Singu and Yenangyat on the Irrawaddy river, to the storage tanks at Rangoon. This practice, however, will probably be discontinued within the next two years, as the Burma Oil Company are about to lay down a pipe line of about 300 miles from the oil fields to Rangoon. In Assam the refineries of the Assam Oil Company are at Digboi,

the place where the oil is actually obtained. These oil fields and refineries are well worthy of a visit and certainly open one's eyes to the magnitude and importance of the petroleum industry, which is not generally realized.

Condition of large installations.

10. The large installations are usually under efficient European supervision and are generally well looked after, although in the older installations the tanks are very much closer to each other and other buildings than would now be allowed. Some of these installations have been in existence for many years without any accident, and although I personally from a safety point of view would prefer to see some of these tanks more separated, it is a difficult matter to interfere with long existing arrangements unless a Municipality or Port Trust can offer suitable land elsewhere or in some way help the firms concerned. Rules are always liable to change, and it hardly seems fair to me to make them retrospective or to put firms to the expense of making great alterations in their installation unless their existing arrangements are distinctly dangerous. A few years ago at Budge Budge near Calcutta all the oil tanks were grouped together within a few feet of one another and in close proximity to the tin making factories and at no great distance from the case oil godowns which are on the bank of the river Hooghly, so that there was always a possibility of a general conflagration, and on page 4 of my Annual Report for the year ending 31st March 1904, I drew attention to the danger of the situation and suggested that the tanks should be removed further inland and separated 100 feet from one another, each in a bunded enclosure, which would mean that the two principal danger areas, *viz.*, the bulk oil storage and the case oil storage, would be at some considerable distance apart with the tinning factory area between them. The Port Commissioners took up this scheme and by reclaiming land and by helping the oil firms in several ways have now very nearly completed the necessary changes, which ought to make Budge Budge probably the best and safest arranged place in the world for the storage of oil. The Asiatic Petroleum Company have all their tanks, ten in number, on the new sites, the Burma Oil Company have five there, and expect to have the three remaining tanks on the old site removed by the end of May 1907. The Standard Oil Company have two tanks on the new ground and still have to move two batching oil tanks. Some of the bunds between the tanks have still to be constructed, but this will not take long directly the tanks are all in position. In Bombay ground in an isolated place near Sewri has been allotted by the Bombay Port Trust to the different oil firms, who have tanks at Mody Bay, where the new docks are in course of construction. All the tanks of the Asiatic Petroleum Company, with the exception of one large liquid fuel tank, which has been allowed to remain where it is for the present, have already been moved and erected on the new sites. The tanks were most successfully floated and towed through the harbour by a launch to near their new site, to which they were hauled up on rollers and allowed to settle on the foundations prepared for them. The entire cost of moving four tanks 35 feet in height, 64 feet in diameter, with a containing capacity of about 698,129 gallons of oil each, and weighing about 120 tons each when empty, was about ₹37,300.

Messrs. Graham and Company, the Agents of the Asiatic Petroleum Company, to whom of course the removal of the tanks has been somewhat expensive, made a representation to Government which was supported by the Port Commissioners and the Chamber of Commerce, Bombay, asking that the tanks at Sewri might be allowed to be closer together than the 100 feet laid down in the new draft consolidated rules for petroleum, inasmuch as the new situation was isolated and in their opinion, owing to the distances they had to keep clear round their installation, there could be no danger to the general public or to their neighbours even if their whole installation caught fire, and it seemed their own concern if they chose to chance this latter risk. After due consideration of their representations, Messrs. Graham and Company were allowed to erect the tanks at a distance from one another of 50 feet apart.

Condition of small bulk oil installations.

11. The small or minor installations are installations in which not more than 50,000 gallons of kerosine oil are stored, and are generally looked after by native agents, employed by the large oil firms. A great deal of inspection of these minor installations has been done by his Department during the last two years with the result that they are gradually improving in condition.

New petroleum installations.

12. The Asiatic Petroleum Company are erecting a large installation on the sandy accretion to the south of the Madras harbour, next door to the installation of the Burma Oil Company. The plans and arrangements for a major installation at Cocanada, which the Burma Oil Company propose to erect, have lately been passed and approved. A considerable number of new minor installations are being established all over India. All these new installations are being constructed in accordance with the latest ideas suggested by this Department.

Inadequacy of inspection staff.

13. In my last year's Annual Report, I referred to the fact that, as I found it was impossible with only one inspector under me to arrange during the year for the inspection of all the petroleum installations as well as the explosives magazines, I had applied for the services of another inspector to enable me to do so. The Government of India, however, were inclined to think that if District Magistrates were supplied with clear and precise instructions as to the points to which attention should be directed, they could possibly inspect all minor installations efficiently and thereby obviate the necessity for a considerable amount of work which is petty in itself and which occupies a large amount of time owing to the fact that minor installations are frequently situated in somewhat inaccessible places. I accordingly drew up a list of general instructions, which I endeavoured to make as simple as possible, to guide District Magistrates in making their inspections, and also a report form to be filled up and sent me after an inspection, so that I could issue orders on the reports made. A copy of these instructions and report form were attached to last year's Annual Report (Appendices C and D). After a year's trial, however, of this procedure I found I was obliged to report the entire failure of this scheme as it produced no real efficiency and only caused great irritation and extra correspondence. The system was viewed with great disfavour both by the local officials and also by the oil firms. The District Magistrate is a very hard-worked official, and usually has no time to make the inspections himself, with the result that they were delegated to subordinate officials whose reports were not always dependable as they did not appear to understand the *raison d'être* of the questions.

I have now again forwarded proposals for the provision of another inspector which I hope will be entertained. The whole of the inspection work of explosives and petroleum in British India has at present to be done by myself and one inspector. These magazines and installations are scattered all over the country, some in places difficult of access, from Peshawar to Tuticorin on the one side and from Karachi to Upper Burma and Assam on the other. During twelve months I have travelled 21,400 miles and my assistant has done 31,200 miles and between us we have done 531 inspections. I consider this a good record which was only possible owing to the fact that neither of us was disabled by any sickness during the year. This good luck cannot always continue, and only a year ago I lost the services of an inspector, who died of abscess of the liver while on tour. Everyone, who has had the misfortune to travel more or less continuously for a series of years (I have had nine years' experience of it) will, I am sure, heartily agree with me that constant travelling in India, with its accompaniments of bad food, disturbed rest and continued changes of climate, is a considerable strain on the constitution and nerves. During the year I have visited all important places but in addition, in order to help my Inspector, I have made a large number of petty inspections which could be much more suitably done by a subordinate, and it should only be necessary for me to visit these small places now and then to check the work of my assistant. The carrying out of this subordinate work gives me less time to devote to big towns and interferes with my office work, which is increasing steadily and becoming daily more and more responsible. I am expert adviser to the Government of India and all the local Governments, and in addition am consulted freely by Government officials, Port Trusts, Municipalities, and the public whenever any question of responsibility or risk with reference to explosives, petroleum or dangerous goods happens to turn up. All the licenses for the storage of explosives and petroleum in bulk (about 450 in number) pass through my hands for recommendation, and I have to scrutinize and pass the plans and point out any necessary conditions. I cannot but regard the consultative work of my appointment as the most important and primary consideration, and this seems but a commonsense view. If the head of

a technical and expert Department is faulty in his knowledge of his special subjects, or in his ideas or in the advice he gives, no amount of inspection work can make matters safe. The inspection work is a mere matter of keeping one's eyes open and observant, and seeing that the conditions imposed at the recommendation of the expert are carried out, and this is what I expect my inspector to do. If he has any doubt as to the condition of any explosive in his inspections, he brings the matter to my notice before any action is taken, so that the whole responsibility falls on my shoulders, and I deal with the case according to my knowledge and experience. Blasting gelatine, which was responsible for several bad explosions, *vide* paragraph 19 of this report, in the years previous to the formation of this Department, has lately been imported in increased quantities and is now being stored in the three Presidencies, whereas up to last year its storage was more or less confined to the Madras Presidency for use in the gold mines. This means considerably more explosive inspection work for this Department. One of my first duties on my obtaining my present appointment was to decide the question whether owing to its unenviable reputation the importation of this explosive should not be prohibited or only allowed if stored under water. Either of these courses would have raised a tremendous outcry from the trade, and I recommended instead frequent inspections (two or three times a year) and a limit being placed to the time it was allowed to be stored in the country. Since this period there have been no explosions in private magazines in India, and the decision arrived at seems to have been justified, but at the present moment I feel that with my present staff it is impossible to efficiently look after both industries and sufficiently safeguard the public and one industry must suffer at the expense of the other. Both of these industries are capable of drawing considerable attention to themselves by some untoward disaster. The services of another inspector, more especially if his head-quarters were fixed at Madras or Bombay, would enable me to divide up the inspection work of India more efficiently and economically and would prevent the same ground being travelled over several times.

Accidents.

14. No accidents have occurred in the magazines or in the one explosives factory (the Roburite Factory at Karachi) licensed in British India. A list of other accidents by fire or explosion that have occurred with explosives, inflammable substances, dangerous chemicals, etc., between the 1st January and 31st December 1906, and have been reported to this Department, is given in Appendix C, and gives a short account of each one. It will be seen from a perusal of the details that the accidents have practically all been caused by gross neglect of ordinary precautions. In all there were 39 accidents causing 36 deaths and injuries to 48 people. Comparative statements given in Appendices D and E show the total number of accidents and the number of persons killed and injured by them during the seven years from 1900 to 1906. It is of course somewhat doubtful whether all the accidents that occur are duly reported to this Department, and therefore it is possible that the statistics given are underestimated.

Gunpowder.

15. There were 13 gunpowder accidents during the year, causing the death of 21 persons and injuries to 28. This big quota of victims is entirely due to one unfortunate blasting accident (Index No. 4) at Elephanta, Bombay, which was responsible for 11 deaths and injuries to 25. I visited the scene of the explosion and submitted a special report on the accident to the Government of India and the Government of Bombay.

Dynamite.

16. Dynamite (two accidents) was responsible for one death and injuries to two persons.

Fireworks.

17. Eleven accidents from fireworks have been reported to this Department, causing four deaths and injuries to fourteen persons. Most of the accidents are caused by the sulphur-chlorate combination of fireworks, which are prohibited in England, and I recommended their prohibition out here, but the Government of India, after due consideration of all the points at issue, decided to allow their manufacture, sale and possession in British India.

18. There were 10 accidents from petroleum reported during the year which were responsible for nine deaths and injuries to three. This record compares very favourably with that of some previous years. The whole loss of life was caused by reckless carelessness. The explosion on an oil flat (Index No. 36) at Dalla Dockyard on the river bank opposite Rangoon was the subject of a special enquiry by the Chief Inspector of Explosives, and orders were issued on his report to prevent any chance of accidents of this kind occurring close to Rangoon, in which place panes of glass were broken by the explosion in question. Luckily the explosion took place at slack water just before the ebb tide as otherwise the burning oil afloat might have done considerable damage to shipping.

Petroleum.

19. Particulars of six Government accidents were communicated to this Department, of which only three were very serious, *viz.*, the two explosions of cordite which occurred at Hyderabad on the 7th and 15th April 1906 and at Ferozepore on the 31st August 1906. Special Boards of Investigation were assembled to enquire into the circumstances under which these explosions occurred, and, if possible, of ascertaining their causes, and the general conclusion arrived at appears to have been that the explosions were due to spontaneous ignition of the cordite from some cause or other. It is somewhat curious that these explosions should have taken place at two places somewhat similar in climate, both being noted for extreme dry heat, which might possibly give rise to electrical excitation or electrical waves, causing sparking. For information I give below the record of nitro-compound explosions which have occurred in India previous to the explosion of cordite referred to above, *viz.*—

Government accidents.

(1) Explosion of two magazines at Nari Gorge and Kach on the Sind-Peshin Railway in 1888.
(2) Explosion of a magazine at Shelabagh on the Sind-Peshin Railway in 1890.
(3) Explosion of a magazine at Antop Hill, Bombay, in 1891.
(4) Explosion of a magazine at Syriam, Burma, in 1896.
(5) Explosion of two magazines at Aden in 1898.

All these explosions were attributed at the time to the spontaneous ignition of blasting gelatine owing to chemical deterioration. There is no doubt that the manufacture of nitro-compounds has considerably improved since those days, but still, from my own experience, I am sure that there is a limit to the period to which nitro-compounds can stand the Indian climate without deterioration, and since 1899 there has been a clause in the rules for the manufacture, possession and sale of explosives in this country, that blasting gelatine and its kindred gelatinous nitro-compounds cannot be kept in any magazine in British India after the expiry of three years from the date of its importation except under the certificate of an Inspector of Explosives granting further short periods of storage. So far this sanction has not in any case allowed more than four years storage in all from date of importation.

20. Two thousand and forty-two tons of explosives were imported into British India during the year 1906, the value being ₹1,940,514. Full details showing the different kinds of explosives imported during the year and the value of each is given in Appendix F. A comparative statement showing the imports of explosives during the last six years is given in Appendix G.

Import of explosives.

21. During the year 1906, 232,142 gallons of dangerous petroleum and 53,118,812 gallons of non-dangerous petroleum were imported by sea into British India. The details are given in Appendix H and also the amounts of dangerous and non-dangerous petroleum produced in Assam and Burma during the year.

Import of petroleum.

22. The consolidated rules for the manufacture, possession and sale of explosives for the whole of British India have been finally issued with Government of India Notification No. 9045-8, dated the 29th November 1906. The draft consolidated rules for the transport and importation of explosives are still under criticism and are likely to be issued very shortly.

Explosives rules.

23. A list of explosives at present authorized for importation into British India, corrected up to March 1907, has been published for general information. Ammonal and Monobel powder have been added to the list during the year. This list is given in Appendix I.

Authorized explosives.

Picric acid.

24. In Appendix J will be found a Notification of the Government of India giving further exemptions as to when Picric Acid shall not be deemed to be an explosive within the meaning of the Explosives Act.

Acetylene.

25. In Appendix K a Notification of the Government of India will also be found exempting Acetylene when in admixture with oil gas under certain conditions from being deemed an explosive within the meaning of the Explosives Act.

Petroleum rules.

26. The draft consolidated rules for petroleum have been published for criticism and are still under consideration. I hope that it may be found possible to issue them finally within the next six months.

Liquid fuel.

27. During the year one of the oil firms, in forwarding me plans of their installation for approval, stated that their liquid fuel tank would not be subject to the rules under the Indian Petroleum Act as it had a flash point of over 200° Farenheit. On referring to the Petroleum Act it appeared to me that their contention was wrong and the Government of India decided that liquid fuel with a flash point of over 200° Fahrenheit was not outside the operation of the Act. The only petroleum that does not come under the operation of the Act is any oil ordinarily used for lubricating purposes and having its flashing point at or above 200° Fahrenheit.

Petrol.

28. During the year some of the oil firms consulted me as to whether I would be disposed to recommend small lean-to sheds for the storage of petrol at their minor installations for the storage of kerosine oil. In reply, I regretted that I could not do so, as I did not think it advisable to have two separate risks, one greater than the other, in one place in close proximity. Petrol is much more dangerous to store than kerosine, on account of its great susceptibility to ignition, and if this small quantity of petrol got ignited, the conflagration would probably involve the whole of the kerosine as well. The firms very courteously dropped the proposal.

Work of the Department.

29. This Department was originally established to deal with explosives, but at present three-fourths of the work is in connection with petroleum which is not an explosive.

I have the honour to be,

SIR,

Your most obedient Servant,

C. A. MUSPRATT-WILLIAMS, *Major, R.A.*,
Chief Inspector of Explosives.

APPENDIX A.

List of Magazines and Licenses granted under Rule 17 of the Explosives Rules for the year 1906.

Presidency or Province.	District.	Magazines.			Licenses.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Bengal	Burdwan	21	...	21	18	...	18
	Darjeeling	3	...	3	3	...	3
	Gaya	7	...	7	5	...	5
	Hazaribagh	13	...	13	11	...	11
	Hooghly	4	...	4	1	...	1
	Manbhoom	14	...	14	12	...	12
	24-Parganas	1	...	1	1	...	1
	Total	63	...	63	51	...	51
Bombay	Ahmedabad	2	...	2	2	...	2
	Bombay	16	3	19	10	3	13
	Dharwar	...	2	2	...	1	1
	Karachi *	9	...	9	5	...	5
	Total	27	5	32	17	4	21
Burma	Hanthawaddy	3	...	3	2	...	2
	Mergui	1	...	1	1	...	1
	Ruby Mines	1	...	1	1	...	1
	Upper Chindwin	...	2	2	...	1	1
	Total	5	2	7	4	1	5
Central Provinces	Balaghat	...	1	1	...	1	1
	Chanda	...	1	1	...	1	1
	Chindwara	...	1	1	...	1	1
	Jbbulpur	3	...	3	2	...	2
	Nagpur	3	...	3	2	...	2
	Narsingpur	...	2	2	...	1	1
	Raipur	4	...	4	4	...	4
	Saugor	1	...	1	1	...	1
	Total	11	5	16	9	4	13
Eastern Bengal and Assam	Cachar	2	...	2	1	...	1
	Lakhimpur	1	...	1	1	...	1
	Total	3	...	3	2	...	2
Madras	Anantapur	...	3	3	...	2	2
	Chingleput	2	...	2	1	...	1
	Godaveri	2	...	2	1	...	1
	Madras	17	...	17	4	...	4
	Nellore	4	...	4	2	...	2
	The Nilgiris	4	...	4	2	...	2
	Tanjore	1	1	2	1	1	2
	Trichinopoly	...	3	3	...	3	3
	Vizagapatam	4	...	4	2	...	2
	Total	34	7	41	13	6	19
United Provinces	Cawnpur	2	...	2	2	...	2
	Dehra Dun	1	...	1	1	...	1
	Gharwal	1	...	1	1	...	1
	Lucknow	1	...	1	1	...	1
	Meerut	1	...	1	3	...	3
	Shajehanpur	1	...	1	1	...	1
	Total	7	...	7	9	...	9
SUMMARY.							
Bengal		63	...	63	51	...	51
Bombay		27	5	32	17	4	21
Burma		5	2	7	4	1	5
Central Provinces		11	5	16	9	4	13
Eastern Bengal and Assam		3	...	3	2	...	2
Madras		34	7	41	13	6	19
United Provinces		7	...	7	9	...	9
	GRAND TOTAL	150	19	169	105	15	120

* At Karachi there is in addition a Roburite Factory licensed under Rule 15.

APPENDIX B.

* List of non-dangerous petroleum installations licensed during the year 1906.

Province.	District.	No.
Ajmer-Merwara	Ajmer	3
	TOTAL	3
Bengal	Balasore	2
	Bhagulpur	5
	Birbbum	3
	Burdwan	7
	Calcutta	6
	Champaran	1
	Chapra	1
	Cuttack	1
	Darbhanga	4
	Darjeeling	1
	Gaya	4
	Howrah	1
	Khulna	1
	Manbhum	1
	Midnapur	1
	Monghyr	4
	Mozufferpur	6
	Murshedabad	1
	Nadia	4
	Palamau	1
	Patna	4
	Purnea	2
	Sambalpur	2
	Santal Parganas	5
	Shahabad	3
	24-Parganas	3
	TOTAL	74
Bombay	Ahmedabad	5
	Ahmednagar	2
	Belgaum	3
	Bijapur	4
	Bombay	3
	Broach	4
	Dharwar	10
	Karachi	5
	Khandesh	7
	Nasik	5
Bombay—*contd.*	Poona	3
	Satara	2
	Sholapur	4
	Surat	5
	Thana	2
	TOTAL	64
Burma	Hanthawaddy	3
	Mergui	3
	Mingyan	1
	Pokoku	3
	Thayetmyo	1
	TOTAL	11
Central Provinces	Akola	6
	Amraoti	7
	Bhandara	3
	Bilaspur	1
	Buldana	3
	Chanda	1
	Hoshangabad	2
	Jubbulpur	6
	Nagpur	3
	Narsinghpur	2
	Nimar	5
	Raipur	1
	Saugor	3
	Seoni	1
	Wardha	5
	TOTAL	49
Eastern Bengal and Assam	Backergan	1
	Bogra	1
	Chittagong	2
	Dinajpur	1
	Jalpaiguri	1
	Mymensingh	1
	Pabna	2
	Rajshaye	2

* This list includes some godowns for the storage of non-dangerous petroleum regarding which this Department has been consulted.

Province.	District.	No.
Eastern Bengal and Assam —*contd.*	Rangpur	2
	Sylhet	1
	TOTAL	14
Madras	Anantapur	2
	Bellary	3
	Chingleput	1
	Coimbatore	5
	Cuddapah	1
	Ganjam	3
	Godavery	2
	Guntur	1
	Kistna	1
	Kurnool	1
	Madras	4
	Madura	4
	Malabar	5
	Nellore	3
	North Arcot	1
	Salem	3
	Shoranor	1
	South Arcot	5
	Tanjore	6
	Tinnevelly	3
	Trichinopoly	1
	Vizagapatam	1
	TOTAL	57
N.-W. Frontier Province	Peshawar	3
	TOTAL	3
Punjab	Delhi	3
	Jullunder	1
	Lahore	2
	Rawal Pindi	2
	Umballa	3
	Multan	1
	TOTAL	12
United Provinces	Agra	4
	Aligarh	1
	Allahabad	3
	Azamgarh	1
	Bahraich	1
	Bara Banki	1
	Bareilly	2
	Basti	1
	Benares	4
	Cawnpur	3
	Dehra Dun	1
	Etawah	1
	Fyzabad	2
	Ghazipur	1
	Gonda	2
	Gorakpur	2
	Jaunpur	1
	Jhansi	3
	Lucknow	2
	Meerut	1
	Mirzapur	1
	Moradabad	2
	Muttra	1
	Saharanpur	1
	Shahjehanpur	2
	TOTAL	44

SUMMARY.

AJMER-MERWARA	3
BENGAL	74
BOMBAY	64
BURMA	11
CENTRAL PROVINCES	49
EASTERN BENGAL AND ASSAM	14
MADRAS	57
N.-W. FRONTIER PROVINCE	3
PUNJAB	12
UNITED PROVINCES	44
TOTAL	331

APPENDIX C.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1906 to 31st December 1906.

Explosives.

No.	Date of accident.	Nature of Explosion.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons Killed.	Number of persons Injured.
1	11th Feb. 1906	Gunpowder .	Pothipuram, Salem	The Magistrate reported that a native finding that some gunpowder, which he used for blasting, did not explode mixed some charcoal with it and got a cooly to pound it in a stone mortar with an iron crowbar when it exploded injuring both men.	1	1
2	3rd Mar. 1906	Do. .	Pandanallur, Tanjore.	The Magistrate reported that an explosion occurred owing to a native taking a naked lamp into a room where gunpowder was stored and a spark from the lamp fell on the powder. The man managed to rush out of the room but sustained slight injuries.	...	1
3	7th Mar. 1906	Do. .	Satyamangalam, Coimbatore.	The Magistrate reported that while a well was being excavated, a native carelessly rested the lighted end of a fuse on some gunpowder lying close to the mouth of the well. This exploded and injured him so severely that he died subsequently.	1	...
4	28th Mar. 1906	Do. .	Elephanta . .	Messrs. Price, Wills and Reeves had been carrying on blasting operations at Elephanta for eighteen months in order to get stone for the New Docks at Bombay. During this time there had been no accident, but on this particular date, although the usual charges of powder were being used, the charge instead of simply displacing the hill-side as it usually had done, seemed to blow through and propelled the débris like a cannon ball to a considerable distance, killing and injuring a number of coolies who were about 83 yards off. Two Europeans in charge of the operations, who were only about 40 yards off, escaped without injury. A fault or crack in the hill-side was the cause of the charge blowing through, and the disaster was the subject of a special inquiry by the Chief Inspector of Explosives who submitted a report on the circumstances to the Government of India and Bombay Government.	11	25
5	10th Apl. 1906	Do. .	Kalarampatti, Salem.	The Magistrate reported that while a native was charging a hole with gunpowder, clay and small pieces of stones for blasting operations in a well, the charge exploded and injured him so seriously that he died two days after.	1	...
6	1st July 1906	Do. .	Coimbatore . .	The District Magistrate reported an explosion which so severely injured a native lad that he died. He was engaged in the excavation of a well and the explosion was due to the lad carelessly handling the fuse from which sparks fell on the gunpowder lying loose near the mouth of the well.	1	...
7	7th Aug. 1906	Do. .	Malagoundenvalasai, Salem.	The Magistrate reported that while a native was extracting a needle from a charge of gunpowder, an explosion occurred, which caused him fatal injuries.	1	...
8	10th Aug. 1906	Do. .	Shevapet, Salem .	While blasting operations were being carried out in a well, one charge missed fire. This charge was then partially removed and while another hole was being drilled alongside that from which the unexploded charge was partially extracted, the gunpowder exploded and caused fatal injuries to a native.	1	...
9	21st Aug. 1906	Do. .	Wardha .	The Assistant Commissioner reported that it is presumed that a native took a lighted candle into a room in which were stored gunpowder, percussion caps, fuses and fireworks and dropped the candle on some gunpowder which he was handling, with the result that there was an explosion and the man was fatally injured.	...	1
10	28th Sept. 1906	Do. .	Trichnopoly .	The Magistrate reported that while a native was filling an iron measure with gunpowder it exploded, killing him.	1	...
11	7th Oct. 1906	Do. .	Mangalore .	The District Magistrate reported that while a native girl was carrying some fire to cook her food, a spark fell on some gunpowder which was spread to dry in the sun and which ignited, causing her serious injuries resulting in death.	1	...

No.	Date of accident.	Nature of Explosion.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
				Explosives—*contd.*		
12	20th Nov. 1906	Gunpowder .	Northern Moncanal, Minbu.	The Deputy Commissioner reported that a Pathan cooly while going to light a fuse attached to a blasting charge, carelessly struck a match over a bowl containing some gunpowder which got ignited and exploded.	1	...
13	25th Nov. 1906	Do. .	Calicut .	The Magistrate reported that a native went into a room, in which 20 lbs gunpowder was stored, with a light in his hand. By some accident the powder took fire and the man was so seriously injured that he died from the effects.	1	...
				TOTAL .	21	28
14	27th Mar. 1906	Dynamite .	Thwe-Chouk, Choung, Thayetmyo.	The District Superintendent of Police, Thayetmyo, reported that a Burman with coolies was blasting rocks, and that after laying a charge he fired it, having first ordered the coolies to run from the shot. All did so except one, who stayed behind, and when the charge exploded, he was killed.	1	...
15	12th July 1906	Do. .	Martaban . .	The Deputy Commissioner, Thaton, reported that owing to a misfire of a dynamite cartridge, while blasting operations were being conducted, two natives were seriously injured by attempting to remove the débris with crowbars.	...	2
				TOTAL .	1	2
16	25th July 1906	Fireworks consisting of chlorate of potash and red arsenic and sulphur.	Hooghly . .	The Magistrate reported that on the occasion of a wedding party, a native under the influence of liquor came and joined the party and began lighting bombs in spite of the remonstrances of the people. One of the bombs burst in his hand causing such severe injuries that he died from the effects.	1	...
17	14th Aug. 1906	Fireworks consisting of saltpetre, sulphur and charcoal.	Calcutta . .	The Commissioner of Police reported that an assistant in a fire-workshop brought some fire-works to a baker and asked to be allowed to place the fire-works near an oven as they were wet. While conversing with the baker who was objecting to permitting this, the bundle of fire-works somehow got ignited and exploded, injuring both of them.	...	2
18	21st Sept. 1906	Crackers consisting of sulphur, chlorate of potash and small stones.	Calcutta . .	The Inspector of Police reported that, while a native was preparing the crackers, one of them exploded, injuring him.	...	1
19	2nd Oct. 1906	Fireworks consisting of chlorate of potash and sulphide of arsenic.	Budaun . .	The Magistrate reported that while three men were making fire-works an explosion took place, killing one of them and injuring the other two.	1	2
20	17th Oct. 1906	Fireworks consisting of sulphur, nitre and potash.	Coimbatore . .	The Magistrate reported that a boy had prepared some fire-works and placed them on the ground. Two other boys began firing crackers near by and a spark from the crackers fell on the fireworks and caused an explosion fatally injuring one of the boys and causing slight injuries to the other two.	1	2
21	17th Oct. 1906	Fireworks consisting of chlorate of potash, sulphide of arsenic and stones.	Calcutta . .	The Commissioner of Police reported that a native was opening a tin box containing the mixed ingredients and smoking a cigarette at the time and a portion of the burnt cigarette fell into the box causing an explosion injuring him severely.	...	1
22	18th Oct. 1906 .	Fireworks (Throwdowns) consisting of sulphide of arsenic and chlorate of potash.	Calcutta . .	The Commissioner of Police reported that while a native lad was making these fire-works the materials exploded, injuring him and two others who were near by.	...	3
23	Oct. 1906 .	Fireworks (Throwdowns) consisting of sulphide of arsenic and chlorate of potash.	Ichapur, 24 Parganas.	The Magistrate reported that while a native lad was playing with fire-works, they exploded, causing serious injuries which resulted in the amputation of his left hand.	...	1

No.	Date of accident.	Nature of explosives.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons. Killed.	Injured.
				Explosives—*contd.*		
24	16th Nov. 1906 .	Fireworks consisting of sulphide of arsenic and chlorate of potash.	Calcutta . .	The Commissioner of Police reported that while a native lad was filling an iron tube with red arsenic and chlorate of potash, the mixture exploded injuring him.	...	1
25	22nd Nov. 1906 .	Fireworks consisting of sulphide of arsenic and chlorate of of potash.	Bombay . .	The Inspector, Arms Department, reported that a native was manufacturing explosive bombs consisting of chlorate of potash and red arsenic with small stones, and whilst the composition was being mixed in his hands it exploded.	...	1
26	19th Dec. 1906 .	Fireworks consisting of sulphide of antimony and chlorate of potash.	Godarvara . .	The Magistrate reported that while a native was grinding sulphide of antimony and chlorate of potash together on a flat piece of stone, the ingredients exploded, injuring him so severely that he died from the effects.	1	...
				Total .	4	14
				Petroleum.		
27	9th Mar. 1906 .	Kerosine . .	Kirkee . .	The Police reported that a native lad went into a room with a lamp in his hands to fill another lamp with oil. The lamp fell from his hands and immediately a fire broke out. There were about 30 to 40 tins of kerosine in the room. The boy was burnt to ashes.	1	...
28	19th Mar. 1906.	Kerosine . .	Rangoon . .	A fire occurred in the premises of a general merchant and oilman stores dealer due to a lamp being upset on some inflammable articles.	...	...
29	23rd Mar. 1906.	Kerosine . .	Bombay . .	While a native woman was cooking, a child who was standing near by upset a kerosine lamp. The woman was severely burnt and died from the effects.	1	...
30	16th April 1906.	Kerosine . .	Budge Budge .	The Superintendent, Petroleum Wharf, Budge Budge, reported that during shunting operations an oil tank wagon took fire and it is believed that as the tank was leaking, some oil must have fallen on some live cinders that were lying under the wagon. Steps have been taken to have an ash pit, and drivers of engines have been instructed to clear out their ash pans at intervals.	...	...
31	28th April 1906.	Kerosine . .	Bhawanipur .	The Inspector of Police reported that a native woman was pouring oil into a lighted kerosine oil lamp, when the lamp accidently fell into a tin of oil which took fire and at once spread, destroying the hut and injuring four people, who subsequently died.	4	...
32	8th May 1906 .	Kerosine . .	Jubbulpur .	The Deputy Commissioner reported that a railway tank wagon was connected to the bulk oil tank of the Standard Oil Company, and about 4-30 P.M. pumping operations were commenced. All went well till 8-15 P.M. when a native struck a match and looked into the tank wagon holding the match before him, to see how much oil was left. An instantaneous explosion occurred and the native was hurled into the air and on to the permanent way where his body, charred almost beyond recognition, was afterwards recovered some 6 yards or so from the foot of the tank wagon. The Local Agent was prosecuted for working after sunset.	1	1
33	28th May 1906 .	Kerosine . .	Calcutta . .	The Commissioner of Police reported that while a native woman was filling a lighted kerosine oil lamp from a canister containing kerosine oil, she accidently set fire to the oil in the canister which exploded, fatally injuring the woman and a boy and severely injuring a girl.	2	1
34	28th May 1906 .	Kerosine . .	Kidderpore, Calcutta.	The Commissioner of Police reported that a cart containing drums of kerosine oil had been placed close to a kerosine shop and that 4 or 5 drums had been shifted into the shop, when one of the drums which was on the cart was observed to be on fire. Some natives began to pull away the cart, but in doing so the lighted drum fell into the shop and set the whole place on fire, together with a number of other shops that were near by. It is believed that some one must have been smoking near the cart.	...	...

No.	Date of accident.	Nature of Explosion.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
				Petroleum—*contd.*		
35	9th Nov. 1906 .	Crude oil .	Yenangyaung .	The Sub-Divisional Officer reported that a hut that was situated near oil well No. 160 of the Burma Oil Company through some cause unknown caught fire and as it burnt, the gas and oil escaping from the well ignited and the well burst into flames. The derrick and machinery on the well was completely burnt and the native owner of the hut was injured.	...	1
36	24th Dec. 1906.	Petroleum .	Rangoon . .	An oil flat, which had been carrying oil, was being steamed and cleansed from oil vapour, and residue oil, by the Irrawaddy Company's employés at Dalla Dockyard on the banks of the Rangoon River opposite Rangoon, and from some cause not absolutely ascertained the vapour outside the flat got ignited with the result that the contents of the flat got also ignited accompanied by a severe explosion, which luckily caused no loss of life or injuries. This accident was the subject of a special enquiry by the Chief Inspector of Explosives.	...	...
				Total .	9	3
				Miscellaneous.		
37	22nd Aug. 1906	Matches . .	Sukea's Lane, Calcutta.	The Commissioner of Police reported that after a case of matches known as "Bengal Coloured Lights" had been removed from one godown to another and stacked away, smoke was seen issuing from it. The fire spread to 3 other cases of matches before it was extinguished.	...	...
38	28th Aug. 1906 .	French Polish .	Poona . .	The Magistrate reported that while a native was pouring some French Polish from a tin into a bottle near a fireplace some of the polish fell into the fire and thereby caused an explosion, injuring the man so severely that he died from the effects.	1	...
39	11th Nov. 1906.	Methylated spirits.	Calcutta . .	The Commissioner of Police reported that the Chief Officer of the S. S. *Hymethus* and the Chief Officer of the S. S. *Colquhoun* went into the hold of the former vessel with two buckets of sulphur and methylated spirits and placed them in cases containing water and then ignited the buckets for fumigating the hold. After doing so one of the men went back carrying a tin of methylated spirits and evidently went too close to the burning buckets as the spirits exploded, injuring him severely.	...	1
				Total .	1	1

Summary of accidents during the year 1906.

Kind of explosive or dangerous and inflammable substance.	Accidents causing loss of life and bodily injury.			Accidents not causing loss of life, or bodily injury.	Total number of accidents.
	Number of accidents.	Number of Persons			
		Killed.	Injured.		
EXPLOSIVES.					
Gunpowder	13	21	28	...	13
Dynamite	2	1	2	...	2
Fireworks	11	4	14	...	11
TOTAL .	26	26	44	...	26
PETROLEUM.					
Petroleum generally . . .	6	9	3	4	10
TOTAL .	6	9	3	4	10
CHEMICALS.	...	...	...	...	...
TOTAL .	...	...	...	...	...
MISCELLANEOUS.	2	1	1	1	3
TOTAL .	2	1	1	1	3
GRAND TOTAL .	34	36	48	5	39

APPENDIX D.

Detailed statement showing the number of accidents and persons killed and injured during the seven years 1900-1906.

Year.	Gunpowder.			Dynamite and other nitro-compound blasting explosives.			Ammunition.			Fireworks.		
	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.
1900 . .	5	22	5	3	...	4	...	...	...	8	4	9
1901 . .	9	8	10	7	3	14	...	...	...	12	12	18
1902 . .	10	8	8	2	1	4	...	...	...	25	22	40
1903 . .	5	9	1	7	5	18	...	...	...	20	8	26
1904 . .	11	25	30	5	3	10	1	...	1	13	10	9
1905 . .	7	6	3	10	6	19	...	...	...	15	13	26
1906 . .	13	21	28	2	1	2	...	...	...	11	4	14
Total .	60	99	85	36	19	71	1	...	1	104	73	142
Average .	8	14	12	5	3	10	1	...	1	15	10	20

Year.	Petroleum.			Chemicals.			Miscellaneous.		
	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.
1900 . .	3	14	...	6	1	11	...	...	...
1901 . .	6	21	3	4	1	1	...	...	...
1902 . .	2	7	1	5	2	2	2	4	...
1903 . .	9	13	14	2	6	3	...	...	...
1904 . .	8	42	10	4	...	9	5	...	1
1905 . .	12	7	13	...	...	...	...	...	...
1906 . .	10	9	3	...	...	...	3	1	1
Total .	51	113	44	21	10	26	10	5	2
Average .	7	16	6	3	1	4	1	5	2

APPENDIX E.

Comparative Statement showing number of accidents and persons killed and injured during the seven years 1900 to 1906.

Years.	Accidents causing loss of life or bodily injury.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	No. of accidents.	Number of persons.			
		Killed.	Injured.		
1900	23	41	29	2	25
1901	32	45	46	6	38
1902	42	44	55	5	47
1903	35	41	62	8	43
1904	40	80	70	7	47
1905	40	32	61	4	44
1906	34	36	48	5	39
Total	246	319	371	37	283
Average	35	45	53	5	40

APPENDIX F.

Statement showing the import of explosives by sea into British India from other countries in the year 1906.

	Imports in 1906.					
	Bengal.	Bombay.	Sind.	Madras.	Burma.	Total.
Quantity.						
Gunpowder, black . . . . lbs.	60,401	77,527	3,750	26,675	...	168,353
Do. smokeless . . . . ,,	5,450	2,300	30,800	1,195	...	39,745
Dynamite . . . . . ,,	8,400	...	23,697	280,110	40,000	352,207
Blasting Gelatine . . . . ,,	...	4,000	...	902,400	...	906,400
Gelignite or Gelatine Dynamite . ,,	12,544	36,000	...	84,050	...	132,594
Monobel powder . . . . . ,,	...	...	...	2,000	...	2,000
Other nitro-compound explosives . ,,	72,921	...	...	...	..	72,921
Detonators . . . . . No.	...	100,000	...	5,436,000	...	5,536,000
Fireworks . . . . . lbs.	...	2,357,147	18,416	28,125	6,700	2,410,388
Total . lbs.	159,716	2,476,974	76,663	1,324,535	46,700	4,084,608
Total . No.	...	100,000	...	5,436,000	...	5,536,000
Value in Rupees.						
Gunpowder, black . . . Rs.	50,110	39,967	1,490	12,889	...	1,04,456
Do. smokeless . . . . ,,	16,386	8,706	39,528	3,345	...	67,965
Dynamite . . . . . ,,	6,755	...	10,765	42,945	32,580	93,045
Blasting Gelatine . . . . ,,	...	3,790	...	8,51,385	...	8,55,175
Gelignite or Gelatine Dynamite . ,,	10,125	28,625	...	66,570	...	1,05,320
Monobel powder . . . . . ,,	...	...	...	1,585	...	1,585
Other nitro-compound explosives . ,,	43,794	...	...	...	...	43,794
Detonators . . . . . ,,	937	1,560	...	1,05,215	...	1,07,712
Fireworks . . . . . ,,	23,506	5,16,707	8,829	7,840	4,580	5,61,462
Total . Rs.	1,51,613	5,99,355	60,612	10,91,774	37,160	19,40,514

APPENDIX G.

Comparative Statement showing the import of explosives by Sea into British India from other Countries during the years 1901 to 1906.

	Imports in					
	1901.	1902.	1903.	1904.	1905.	1906.
Gunpowder, black . . . lbs.	178,259	211,035	272,423	473,925	202,751	168,353
„ smokeless . . . „	17,379	26,605	31,004	48,246	45,125½	39,745
Dynamite . . . . . „	355,080	189,896	416,480	149,968	249,968	352,207
Blasting Gelatine . . . . „	610,000	725,000	843,432	895,040	558,200	906,400
Gelignite or Gelatine Dynamite . „	61,950	50,000	22,096	55,048	123,048	132,594
Monobel Powder . . . . „	...	...	...	...	...	2,000
Other Nitro-Compound Explosives . „	125,529	107,071	222,104	130,811	109,475	72,921
Detonators . . . . . No.	2,679,000	3,297,509	4,388,400	3,020,000	1,797,000	5,536,000
Fireworks . . . . . lbs.	833,268	1,147,223	1,971,317½	2,264,162	1,661,229	2,410,388
Total . . lbs.	2,181,465	2,456,830	3,778,856½	4,017,200	2,949,796½	4,084,608
Total . No.	2,679,000	3,297,509	4,388,400	3,020,000	1,797,000	5,536,000

APPENDIX H.

Statement showing the quantity of dangerous and non-dangerous petroleum imported by sea into British India during the year 1906.

	Dangerous.	Non-Dangerous.	
	Gallons.	Gallons.	
Balasore	...	26,200	
Chandbali	...	405,000	
Chittagong	...	1,822,051	
Calcutta	...	20,342,078	
Bombay	184,243*	17,402,913	*Includes composition paint and rubber solution.
Sind	9,795	5,007,932	
Madras	38,104	6,956,459	
Burma	...	1,156,179	
TOTAL .	232,142	53,118,812	

Statement showing the quantity of dangerous and non-dangerous petroleum produced in Assam and Burma during the year 1906.

	Dangerous.	Non-Dangerous.	
	Gallons.	Gallons.	
Assam	21,855	1,890,942	
Burma	125,356,400	95,848,500	
TOTAL .	125,378,255	97,739,442	

APPENDIX I.

DEPARTMENT OF EXPLOSIVES.

NOTIFICATION.

Dated Calcutta, the 27th March 1907.

No. 517.—With reference to Notification No. 4694—3-12, dated the 4th September 1905, of the Government of India, Department of Commerce and Industry, publishing amendments made in the rules to regulate the transport and importation of explosives, published with the like Notification No. 5528, dated the 11th October 1901, the following list of "authorized explosives" referred to in rule 2 (1) of the above rules is published for general information:—

LIST OF AUTHORIZED EXPLOSIVES.

The following explosives are at present authorized for importation into British India for general sale:—

Class 1.—GUNPOWDER.

GUNPOWDER.

Class 2.—NITRATE MIXTURE.

AMMONAL.

RIPPLENE.

Class 3.—NITRO-COMPOUND.

Every explosive in this class and every explosive ingredient thereof shall be so thoroughly purified and otherwise of such character as to satisfy a test known as the heat test, and specified in Schedule A of Home Department Notification No. 5529, Public, dated the 11th October 1901.

Division 1.

ALBIONITE.
AMBERITE NO. 1.
BALLISTITE.
BLASTING GELATINE.
CARBONITE.
CELTITE.
CORDITE.
CORDITE, M. D.
DYNAMITE.
GELATINE DYNAMITE NO. 1.
GELATINE DYNAMITE NO. 2, OR GELIGNITE.
MONOBEL POWDER.
PHŒNIX POWDER.

Provided that every explosive in this division shall be of such character and consistency as not to be liable to liquefaction or exudation.

Division 2.

AMBERITE NO. 2.
AMMONITE.
COOPPAL'S POWDER.
E. C. SPORTING POWDER.
EMPIRE POWDER.
GUNCOTTON.
HENRITE.
SCHULTZE GUNPOWDER.

KYNOCH'S SMOKELESS SPORTING POWDER.
NEGRO POWDER.
PICRIC ACID.
PICRIC POWDER.
RIFLEITE.
ROBURITE.
S. R. POWDER.
S. S. POWDER.
SMOKELESS POWDER.
SMOKELESS BLASTING POWDER.

Class 4.—CHLORATE MIXTURE.
Nil.

Class 5.—FULMINATE.
Nil.

Class 6.—AMMUNITION.

Division 1.
SAFETY FUZES FOR BLASTING.
SAFETY ELECTRIC FUZES.
PERCUSSION CAPS.
RAILWAY FOG SIGNALS.
SAFETY CARTRIDGES.

Division 2.
CARTRIDGES FOR CANNON, SHELLS, MINES, BLASTING, OR OTHER LIKE PURPOSES.
CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.
ELECTRIC FUZES.
FUZES FOR BLASTING WHICH ARE NOT SAFETY FUZES.
FUZES FOR SHELLS.
TUBES FOR FIRING EXPLOSIVES.
WAR ROCKETS.

Division 3.
CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.
DETONATORS.
ELECTRIC DETONATORS.
FUZES FOR BLASTING WHICH ARE NOT SAFETY FUZES.
FRICTION TUBES.
FUZES FOR SHELLS.
FUZES FOR FIRING EXPLOSIVES.

Class 7.—FIREWORK.
Division 1.
Nil.

Division 2.—Manufactured Fireworks.
MANUFACTURED FIREWORKS.
AMORCES.
CHINESE CRACKERS.

C. A. MUSPRATT-WILLIAMS, *Major, R.A.*,
Chief Inspector of Explosives in India.

APPENDIX J.

No. 5631—17.

GOVERNMENT OF INDIA.

DEPARTMENT OF COMMERCE AND INDUSTRY.

NOTIFICATION.
Explosives.

Dated Simla, the 20th July, 1906.

In exercise of the powers conferred by section 17 of the Indian Explosives Act, 1884 (IV of 1884), the Governor-General in Council is pleased to make the following amendments in the Rules published with the Notification of the Government of India in the Department of Commerce and Industry, No. 5484—4-10 (Explosives), dated the 2nd October 1905, namely :—

In section III for the word "exception" the word "exceptions" shall be substituted, and the following clause shall be added, namely :—

(*b*) Picric Acid thoroughly mixed with not less than three times its own weight of—

(i) anhydrous sulphate of soda,

(ii) crystallized sulphate of soda, when packed in hermetically closed packages, or

(iii) potash alum,

shall be exempt from being deemed to be an explosive within the meaning of the said Act.

W. L. HARVEY,
Secretary to the Government of India.

APPENDIX K.

No. 4197-26.

GOVERNMENT OF INDIA.

DEPARTMENT OF COMMERCE AND INDUSTRY.

Explosives.

NOTIFICATION.

Simla, the 1st June 1906.

In supersession of the Notification of the Government of India in the Home Department No. 1747, dated 11th August 1899, and in exercise of the powers conferred by section 17 of the Indian Explosives Act, 1884 (IV of 1884), the Governor-General in Council is pleased hereby to declare that acetylene when liquid or when subject to a pressure greater than $1\frac{1}{20}$ atmospheres shall be deemed to be an explosive within the meaning of the said Act:

Provided that, subject to the conditions hereinafter specified, acetylene, when in admixture with oil-gas, shall not be deemed to be an explosive within the meaning of the said Act, when under compression—

(1) The acetylene shall be generated only by the Atkins Dry Process.

(2) The proportion of acetylene shall not exceed fifty parts by volume in every one hundred parts of the mixture of acetylene and oil-gas.

(3) The acetylene and oil-gas shall be mixed together in a chamber or vessel before the gases are subjected to compression.

(4) The mixture shall not be compressed to a pressure exceeding one hundred and fifty pounds per square inch.

W. L. HARVEY,
Secretary to the Government of India.

G. I. C. P. O.—No. 89 C. I.T.—29-5-07.—650.

Indian Explosives Act (IV of 1884).

Indian Petroleum Act (VIII of 1899).

NINTH ANNUAL REPORT

OF THE

CHIEF INSPECTOR OF EXPLOSIVES IN INDIA,

BEING HIS

Annual Report for the Year ending 31st March 1908.

BOMBAY
PRINTED AT THE GOVERNMENT CENTRAL PRESS
1908

134358

Ninth Annual Report of the Chief Inspector of Explosives, India.

No. 1075.

FROM

MAJOR F. G. SMALLWOOD, M. V. O., R. A.,
Offg. Chief Inspector of Explosives in India;

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,
DEPARTMENT OF COMMERCE AND INDUSTRY.

Simla, the 30th June 1908.

SIR,

I have the honour to submit herewith a report of the work of this Department for the year ending 31st March 1908.

Personnel.

2. Owing to the large amount of inspection work to be done, it was considered necessary to strengthen this Department by the appointment of another Inspector. The Secretary of State sanctioned the appointment, and Lieutenant J. W. Turner, Assistant Commissary and Head Overseer, Proof Department, Balasore, was appointed second Inspector of Explosives on probation for two years with effect from 2nd December 1907.

On the 1st of March 1908 Major C. A. Muspratt-Williams availed himself of three months' privilege leave combined with six months' furlough, and I took over charge of the duties of officiating Chief Inspector of Explosives in India from that date.

Number of magazines.

3. During the year 1907, 126 licenses (or 6 more than in the previous year) were granted in British India under Rule 17 of the rules to regulate the manufacture, possession and sale of explosives. The number of magazines licensed was 173, or 4 more than in 1906, and is in excess of the number of licenses granted, because in a number of cases firms have two or more magazines in one place under one license. A statement showing the number and location of the magazines and also the number of licenses granted in British India is given in Appendix A. It will be seen from this statement how widely dispersed these magazines are, and how in some cases they are situated in places very difficult of access, and consequently considerable time has to be spent in getting from place to place, which necessarily, to a certain extent, curtails the number of inspections that can be made during the year.

Inspection of explosives magazines during the year.

4. During the year 225 inspections of magazines were made. A number of magazines were inspected two or three times each. Those magazines are inspected most frequently, which are situated in the neighbourhood of towns or in populous localities, or which contain large quantities of explosives, or any explosive, which on account of greater susceptibility to decomposition and consequent ignition, it is considered advisable to examine and test more than other explosives. The Roburite Factory at Karáchi was also inspected twice. The number of magazines inspected has been less than in the previous year, but this

is due chiefly to the fact that during the last year considerable additional inspection work in connection with petroleum has been carried out by this Department. As most of the small magazines in the coal districts of Bengal and elsewhere are now in a satisfactory condition, it has not been considered necessary to have them inspected more than once a year, more especially as the large feeder magazines are inspected two or three times a year.

Condition of Magazines.

5. The magazines generally are reported to be in good order, and as usual, magazine owners have been found most willing to carry out recommendations even when involving considerable expense, and the thanks of this Department are due to them for making the duties of the Chief Inspector and Inspectors of Explosives easy in this respect.

Conditon of explosives in Magazines.

6. The physical condition of all explosives in the different magazines during the year was found to be good with the exception of about 120lbs. of gunpowder, a few pounds of dynamite, carbonite and gelignite and 102 coils of fuse stored in magazines in the Bengal Coal District and Gaya which were found to be damp and unserviceable and which were ordered to be destroyed.

Thefts.

7. During the year two cases of thefts of explosives were reported to this Department. The door of the magazines of Messrs. F. F. Christien and Company at Dhab was broken and about 20 lbs. of dynamite, 300 detonators and 149 coils of fuse were stolen. The magazine of Messrs. Gladstone, Wyllie and Company's Mica Mining Works at Bhagitand was broken into by wrenching off the metal staples of the outer door and 170 lbs. dynamite, 2,500 detonators and six bundles of fuse were stolen. Both these magazines are in the Hazaribagh District. There are, however, no regulations to ensure the thefts of explosives should be reported to this office, and I have reason to believe that thefts have been more frequent than these two recorded cases would lead one to suppose.

Number of petroleum installations.

8. During the year under report, 411 licenses for the storage of non-dangerous petroleum, with which this Department has been concerned or consulted, were granted, an increase of 80. A list of these installations, corrected up to date and showing the districts in which they are located, is given in Appendix B. In addition, of course, there are a number of storage godowns for the possession of non-dangerous petroleum in non-bulk, licensed by District officers of which this Department has no cognizance.

Inspection of petroleum installations during the year.

9. During the year the Chief Inspector of Explosives personally visited the large bulk oil installations at Madras, Karáchi, Bombay, Calcutta, (Budge Budge and Narculdanga), Chittagong and Rangoon, and also the oil fields in Assam and Burma. A large number of the minor installations were also inspected by the Inspectors of Explosives. In all 432 petroleum inspections were made. An increase of 134.

Condition of major oil installations.

10. The large installations were reported to be efficiently supervised.

There seems to me to be still one grave defect in their conception, to which I would invite the attention of both the Port authorities and the firms concerned. At present in case of fire, existing arrangements only permit of oil being pumped from one tank to another tank within the installation or danger zone. It would be easy to quote instances where every tank within a large installation has eventually participated in a conflagration.

No large installation can be considered really efficient until there is a safety or emergency tank right away from the oil area.

Condition of minor bulk installations.

11. These are still in an unsatisfactory condition. Practically the only safeguard for the general public against the dangers of these minor installations is their containing wall to prevent and escape of burning oil.

The weak points in these containing walls are the drainage escape apertures and these are fitted with admirably designed valves. Unfortunately during my inspections I have found all the valves open although there had been no rain for months, and in some cases the screws actuating the valves had so rusted in their collars that they could not be shut down.

I have addressed oil firms on the subject and feel sure that they will do all in their power to ensure that the valves are kept closed unless actually required to be opened for drainage purposes.

Condition of oil fields.

12. The Assam oil fields and refinery have been inspected once and Burma twice. Important questions regarding the Burma oil fields are now under the consideration of both the Government of Burma and the Government of India.

The existing arrangements for testing petroleum in Assam were found to be unsatisfactory and I have addressed the Local Government on the subject.

Accidents.

13. No accidents have occurred in the magazines or in the one explosives factory (the Roburite Factory at Karachi) on the books of this office. An explosion (item No. 5 of Appendix C) occurred on the 5th April 1907 in a magazine at Jatachapur in the Chindwara District of the Central Provinces. It appears the licensee was granted a license under the Indian Arms Act to possess gunpowder and fuses but that other explosives were also kept in the magazine. The licensee was prosecuted under section 19 (*b*) of the Arms Act and fined Rs. 300. A list of accidents that have occurred with explosives, inflammable substances, dangerous goods, etc., between the 1st January and 31st December 1907, and have been reported to this Department is given in Appendix C and gives a short account of each one. It will be seen from a perusal of the details that the accidents have practically all been caused by gross neglect of ordinary precautions. In all there were 58 accidents causing 46 death and injuries to 60 people. Comparative statements given in Appendices D and E show the total number of accidents and number of persons killed or injured by them during the last five years. As stated in my previous reports it is doubtful whether all accidents that occur are reported to this Department and therefore it is possible that the statistics given are underestimated.

Gunpowder.

14. There were 11 accidents from gunpowder causing 18 deaths and injuries to 20 persons.

Nitro-Compounds.

15. Nitro-compounds were responsible for 4 accidents which caused injuries to 6 persons. These accidents were all due to misfires which subsequently exploded.

Ammunition.

16. Reports were received of 3 accidents from ammunition causing injuries to 4 persons.

Fireworks.

17. Nineteen accidents from fireworks were reported to this Department, causing 12 deaths and injuries to 20 persons. As usual, most of the accidents were caused by the handling of sulphur chlorate combinations of fireworks.

Petroleum.

18. There were 15 accidents from petroleum causing 9 deaths and injuries to 8 persons. Fortunately none of the accidents were attended with any serious loss of life. There were two big fires from petrol, one at Bombay Harbour and the other at Budge Budge (items 48 and 50 Appendix C). The transport of petrol by wooden barges is under consideration.

Government Accidents.

19. Details of 5 Government accidents were received during the year and do not call for any special comment.

Import of Explosives.

20. Two thousand one hundred and twenty-eight tons of explosives were imported into British India during 1907, the value being Rs. 22,15,475. Details showing the different kinds of explosives imported and the value of each are given in Appendix F. A comparative statement showing the quantity of explosives imported during the last 5 years is given in Appendix G.

Import of Petroleum.

21. During the year under report 132,661 gallons of dangerous petroleum and 73,513,913 gallons of non-dangerous petroleum were imported by Sea into British India. The details are given in Appendix H, and also the quantity of dangerous and non-dangerous petroleum produced in Assam and Burma during the year.

Explosives Rules.

22. The only amendment made to the Rules for the manufacture, possession and sale of explosives was that including " flare lights " used by Railway watchmen for signalling purposes in Rule 11 (3) (*viii*). The Government of Bombay has under Rule 17 (1) of the above rules authorised Commissioners of Divisions, the Commissioner of Sind and the Commissioner of Police, Bombay, to grant licenses for magazines. The Government of the United Provinces has also authorised Commissioners of Divisions to grant similar licenses.

23. The revised rules for the transport and importation of explosives, and those for testing explosives were finally issued by the Government of India with Department of Commerce and Industry Notification No. 4555-4, dated 31st May 1907. Amendments to Rules 17 and 18 were made in December 1907 permitting gunpowder, explosives of the 1st Division of the 6th ammunition class, and of the 7th firework class to be imported at the Port of Chittagong.

Authorised Explosives.

24. A list of explosives at present authorised for importation into British India, for general sale, has been published in the *Gazette of India* for information. This list is given in Appendix I.

Petroleum Rules.

25. The consolidated petroleum rules, after having been scrutinised by an informal Committee, are still under consideration, and every hope is now entertained of the rules being finally issued within a few months. It is satisfactory to note that similar legislation is contemplated in the United States.

Owing to the large use of petrol in an oil mill, the Government of Bengal amended their rules for the storage of dangerous petroleum so as to permit in special cases the possession of petrol in receptacles containing not more than 500 gallons each.

Motorine.

26. Motorine, which was included in the list of dangerous petroleum and brought under the class of dangerous goods in the rules for working open lines of Railway in British India administered by Government, was found to be a lubricant and not dangerous petroleum, and was consequently removed from the list of dangerous goods in the rules.

Compressed Gases.

27. The Railway Board decided that the rules for packing and carriage by rail of compressed gases which are in force in England should be adopted for India, subject to such modifications as the physical condition of this country may require, and that Compressed Hydrogen, Oxygen, Compressed Carbonic Acid Gas, and Compressed Air may be permitted to be carried by passenger train. The rules for working open lines of Railway in British India administered by Government were accordingly amended.

Sulphuric Acid.

28. The rules for the carriage of sulphuric acid by rail were amended by the Railway Board during the year.

Government Chemicals.

29. Chemicals supplied for all Government Departments in India through the agency of the Store Department of the India Office, London, were exempted by the Railway Board from the rules for the carriage of dangerous goods by rail, under certain conditions.

Gas installations.

30. In view of the increasing use of gas for the lighting of public buildings, railway stations, etc., it seems expedient to warn persons in charge of such installations of the danger of controlling them by one general closing valve.

When the gas is turned off at day light by means of the controlling valve, the subordinates in charge of waiting or refreshment rooms, etc., do not trouble to turn it off also at the burners, with the result that the following evening at lighting up time gas is poured into these rooms through the burners until some one's attention is drawn to them by the smell of escaping gas.

Accidents are inevitable from this cause unless more attention is paid to this matter by those responsible. Nearly all reported gas accidents in England may be attributed to the neglect of servants to turn off gas at the burners.

Care and use of petroleum lamps.

31. The death of a soldier, owing to his having blown *down* a chimney to extinguish a lamp, and other similar accidents, show that many people are still ignorant of the danger of this practice. These accidents show the possibility of blowing the flame down into the oil reservoir.

The suggestions issued by the Secretary of State in 1901 in this connection seem worth repetition.

"Lamps which have no extinguisher should be put out as follows:—The wick should be turned down until there is only a small flickering flame, care being taken not to turn down so far that the wick falls into the oil container. The small flame may be extinguished by placing a piece of flat tin or card on the top of the chimney, or by blowing *across* the top of the chimney. Never blow down the chimney."

Work of this Deparment.

32. This Department which was originally established to deal with explosives, is now chiefly occupied by questions in connection with petroleum.

I have the honour to be,

Sir,

Your most obedient Servant,

F. G. SMALLWOOD, Major, R. A.,
Officiating Chief Inspector of Explosives in India.

B 798—2

APPENDIX A.

List of Magazines and Licenses granted under Rule 17 of the Explosives Rules for the year 1907.

Presidency or Province.	District.	Magazines.			Licenses.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Bengal	Burdwan	22	...	22	19	...	19
	Darjeeling	3	...	3	3	...	3
	Gaya	4	...	4	4	...	4
	Hazaribagh	12	2	14	10	2	12
	Hooghly	4	...	4	1	...	1
	Manbhoom	14	...	14	12	...	13
	24-Parganas	1	...	1	1	...	1
	TOTAL	60	2	62	50	2	52
Bombay	Ahmedabad	2	...	2	2	...	2
	Bombay	19	...	19	13	...	13
	Dhárwár	2	...	2	1	...	1
	Karachi*	9	..	9	5	...	5
	TOTAL	32	...	32	21	...	21
Burma	Hanthawaddy	3	...	3	2	...	2
	Mergui	1	...	1	1	...	1
	Ruby Mines	1	...	1	1	...	1
	TOTAL	5	...	5	4	...	4
Central Provinces	Balaghat	1	...	1	1	...	1
	Bilaspur	1	...	1	1	...	1
	Chindwara	1	1	2	1	1	2
	Jubbulpur	3	...	3	2	...	2
	Nágpur	3	1	4	2	1	3
	Narsingpur	2	...	2	1	...	1
	Raipur	4	...	4	4	...	4
	Saugor	1	...	1	1	...	1
	TOTAL	16	2	18	13	2	15
Eastern Bengal and Assam	Cachar	2	...	2	1	...	1
	Lakhimpur	1	...	1	1	...	1
	TOTAL	3	...	3	2	...	2
Madras	Anantapur	3	...	3	2	...	2
	Chingleput	2	...	2	1	...	1
	Godaveri	2	...	2	1	...	1
	Kistna	...	1	1	...	1	1
	Madras	17	2	19	4	1	5
	Nellore	4	...	4	2	...	2
	The Nilgiris	4	...	4	2	...	2
	North Arcot	...	1	1	...	1	1
	Tanjore	2	...	2	2	...	2
	Trichinopoly	2	...	2	2	...	2
	Vizagapatam	4	1	5	2	1	3
	TOTAL	40	5	45	18	4	22
Punjab	Rawal Pindi	1	...	1	1	...	1
	TOTAL	1	...	1	1	...	1
United Provinces	Cawnpur	2	...	2	2	...	2
	Dehra Dun	1	...	1	1	...	1
	Gharwal	1	...	1	1	...	1
	Lucknow	1	...	1	1	...	1
	Meerut	1	...	1	3	...	3
	Shahjehanpur	1	...	1	1	...	1
	TOTAL	7	...	7	9	...	9

SUMMARY.

Bengal	60	2	62	50	2	52
Bombay	32	...	32	21	...	21
Burma	5	...	5	4	...	4
Central Provinces	16	2	18	13	2	15
Eastern Bengal and Assam	3	...	3	2	...	2
Madras	40	5	45	18	4	22
Punjab	1	...	1	1	...	1
United Provinces	7	...	7	9	...	9
GRAND TOTAL	164	9	173	118	8	126

* *At Karáchi there is in addition a Roburite Factory licensed under Rule 15.

APPENDIX B.

*List of non-dangerous petroleum installations licensed during the year 1907.

Province.	District.	No.
Ajmer-Merwara ...	Ajmer ...	3
	TOTAL ...	3
Baluchistan ...	Quetta ..	1
	TOTAL ...	1
Bengal ...	Balasore ...	2
	Bhagulpur ...	5
	Birbhum ...	2
	Burdwan ...	7
	Calcutta ...	3
	Champaran ...	1
	Cuttack ...	2
	Darbhanga ...	3
	Darjeeling ...	1
	Gaya ...	4
	Howrah ...	2
	Khulna ...	1
	Manbhum ...	1
	Midnapur ...	1
	Monghyr ...	4
	Mozufferpur ...	5
	Murshedabad ...	1
	Nadia ...	4
	Patna ...	4
	Purnea ...	2
	Sambalpur ...	2
	Saran ...	2
	Shahabad ...	3
	Santal Parganas ...	5
	24-Parganas ...	7
	TOTAL ...	74
Bombay ...	Ahmedabad ...	6
	Ahmednagar ...	3
	Belgaum ...	4
	Bijapur ...	5
	Bombay ...	3
	Broach ...	4
	Dhárwár ...	11
	Hyderabad ...	1
	Karáchi ...	6
	Khándesh ...	10
	Násik ...	5
	Poona ...	3
	Sátára ...	2
	Sholápur ...	4
	Surat ...	5
	Thána ...	4
	TOTAL ...	76
Burma ...	Hanthawaddy ...	3
	Mergui ...	4
	Mingyan ...	1
	Pokoku ...	3
	Thayetmyo ...	1
	TOTAL ...	12
Central Provinces ...	Akola ...	6
	Amráoti ...	8
	Bhandara ...	3
	Bilaspur ...	1
	Buldana ...	8
	Chanda ...	2
	Damoh ...	1
	Hoshangabad ...	4
	Jubbulpur ...	7
	Nágpur ...	4
	Narsingpur ...	3
	Nimar ...	5
	Raipur ...	1
	Saugor ...	3
	Seoni ...	2
	Wardha ...	9
	TOTAL ...	67
Eastern Bengal and Assam.	Backergunj ...	1
	Bogra ...	1
	Chittagong ...	2
	Dacca ...	1
	Dinajpur ...	2
	Jalpaiguri ...	1
	Mymensingh ...	1
	Pabna ...	2
	Rajshaye ...	2
	Rungpur ...	2
	Sylhet ...	1
	TOTAL ...	16
Madras ...	Anantapur ...	2
	Bellary ...	4
	Chingleput ...	3
	Coimbatore ...	6
	Cuddapah	1
	Ganjam ...	4
	Godavery ...	5
	Guntur ...	3
	Kistna ...	3
	Kurnool ...	2
	Madras ...	5
	Madura ...	6
	Malabar ...	11

* This list includes some godowns for the storage of non-dangerous petroleum regarding which this Department has cognizance.

Province.	District.	No.	Province.	District.	No.
Madras - *continued.*	Nellore ...	5			
	North Arcot ...	2	United Provinces ...	Agra ...	4
	Salem ...	3		Aligarh ...	1
	South Arcot ...	7		Allahabad ...	3
	Tanjore ...	7		Azamgarh ...	1
	Tinnevelly ...	6		Bahraich ...	1
	Trichinopoly ...	2		Bara Banki ...	1
	Vizagapatam ...	2		Bareilly ...	2
	TOTAL ...	89		Basti ...	1
				Benares ...	4
				Cawnpur ...	3
				Etawah ...	1
North-West Frontier Province.	Peshawar ...	3		Fyzabad ...	2
				Ghazipur ...	1
	TOTAL ...	3		Gonda ...	2
				Gorakpur ...	2
				Jaunpur ...	1
				Jhansi ...	3
Punjab ...	Amritsar ...	3		Lucknow ...	2
	Delhi ...	3		Meerut ...	4
	Jullunder ...	1		Moradabad ...	2
	Lahore ...	3		Muttra ...	1
	Ludhiana ...	3		Saharanpur ...	3
	Rawal Pindi ...	3		Shahjehanpur ...	2
	Sialkot ...	3			
	Umballa ...	4			
	TOTAL ...	23		TOTAL ...	47

SUMMARY.

AJMER-MERWARA ...	3
BALUCHISTAN ...	1
BENGAL ...	74
BOMBAY ...	76
BURMA ...	12
CENTRAL PROVINCES ...	67
EASTERN BENGAL AND ASSAM ...	16
MADRAS ...	89
NORTH-WEST FRONTIER PROVINCE ...	3
PUNJAB ...	23
UNITED PROVINCES ...	47
TOTAL ...	411

APPENDIX C.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1907 to 31st December 1907.

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			Explosives.			
1	13th Feb. 1907.	Gunpowder ...	Salem ...	The Magistrate reported that while a native was firing a salute from an iron tube charged with gunpowder a spark from the discharge exploded some gunpowder that was kept close by in a pot resulting in the death of the man.	1	...
2	25th Feb. 1907.	Do. ...	Chidambaran ...	The District Magistrate reported that while a licensee in company with some others was pounding sulphur, saltpetre and charcoal in clay pots an explosion occurred so severely injuring them that they died from the effects.	8	...
3	28th Feb. 1907.	Do. ...	Salem ...	The Magistrate reported that an iron tube was filled with gunpowder and clay and was being rammed with an iron crow-bar, when the charge exploded and a spark from it set alight some gunpowder kept close by on the ground injuring three persons.	...	3
4	4th June 1907.	Do. ...	Bombay ...	The Commissioner of Police reported that a fire broke out in the premises of one Krishnaji Mukandas, licensed for the manufacture of country blasing powder. The hut, where manufacture was conducted, was made of jowhi leaves and was completely burnt to the ground. It contained 14 lbs. sulphur —28 lbs. of saltpetre and 56 lbs. charcoal. It is believed that the fire was caused by a servant of the licensee opening the door of the hut, while smoking a cigarette, and that sparks from the cigarette fell on some loose blasting powder, the remains of the previous day's manufacture.	...	...
5	5th April 1907.	Gunpowder, Dynamite, etc.	Jatachapur, Chindwara.	The Deputy Commissioner reported that a building containing 161 dynamite cartridges, 183 detonators, 167 fuses and 17 seers of gunpowder, of which this Department had no cognizance suddenly exploded at night. No one was injured, though the building was of course demolished, and no explanation of the cause of the accident could be given.	...	...
6	17th June 1907.	Do. ...	Mau ...	The Magistrate reported that when some women were engaged in manufacturing gunpowder an explosion suddenly occurred which was probably due to the presence of grit in the grinding mill.	6	...
7	20th June 1907.	Gunpowder ...	Kavandam Poliam .	The Magistrate reported that while a native was manufacturing gunpowder a spark fell on the powder which caused an explosion.	...	1
8	10th Augt. 1907.	Do. ...	Timvalur ...	The District Magistrate reported that a native loaded athervedis with a small quantity of gunpowder from a pot and handed the pot over to a boy. He then set fire to the athervedi before the boy had gone to a sufficient distance with the result that a spark fell into the pot of gunpowder, which exploded and six by-standers were injured, two of whom died from the effects of the injuries.	2	4
9	15th Augt. 1907.	Do. ...	Goundampalaiyam .	The District Magistrate reported that while some natives were deepening a well by blasting, a native woman brought some fire near by and a spark from it fell on some gunpowder kept near the well which resulted in an explosion injuring three persons.	...	3
10	1st Sept. 1907.	Do. ...	Avarappakkam ...	The District Magistrate reported that a native lad was engaged in charging athervedis with gunpowder when he asked another lad to get him a cigarette which a native was smoking at some distance. The lad in handing the cigarette accidentally dropped it into a pot of gunpowder, with the result that an explosion occurred causing injuries to eight boys who were sitting round, one of whom has since died.	1	7
11	7th Dec. 1907.	Do. ...	Valasore, Salem ...	The District Magistrate reported that while two coolies were engaged in deepening a well by blasting, one of the men while charging one of the bore holes with gunpowder by means of an iron crow-bar, exploded the charge, which injured both men.	...	2
				TOTAL ...	18	20

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed	Injured.
				Explosives—*continued.*		
12	21st Aug. 1907.	Dynamite ...	Jawatary, Nawadah.	A number of coolies were coming out of Jawatary mine after igniting the fuzes of the dynamite charges, which were being used for blasting. The fuze of one charge was wet and consequently this charge did not go off with the others and this was not detected. When two of the coolies were clearing away the debris, the charge went off, injuring them both.	...	2
13	2nd Nov. 1907.	Gelignite cartridges.	Bombay ...	The Commissioner of Police reported that during blasting operations one charge appeared to misfire, and after waiting for a couple of hours the operators made a search for it and, as the search proved fruitless, boring operations were again commenced. Two men were working together with an iron crow-bar when it struck the misfired cartridges which exploded, seriously injuring both men.	...	2
14	7th Dec. 1907.	Dynamite ...	Elephanta ...	Contrary to instructions a native drilled a bore hole near another misfired one. The hole that was being drilled ran into the misfired one which was in a sloping position and the man having struck the detonator caused the charge to explode.	...	1
15	27th Dec. 1907.	Do. ...	Do. ...	A man was drilling a bore hole near a misfired one which was covered with moorum and was not noticed. The charge in the misfired hole was struck which caused it to explode.	...	1
				TOTAL ...	...	6
16	16th Aug. 1907.	Detonator ...	Arkonam ...	The District Magistrate reported that a native lad found a detonator near a well and in pressing it with a pencil to make it fit as a pencil case it exploded, seriously injuring him.	...	1
17	23rd Aug. 1907.	Cartridges ...	Bombay ...	The Commissioner of Police reported that while coolies were breaking up some cartridges which was done by jamming them by a process of beating them down with a hammer to prevent the consignor making use of them, one of the cartridges exploded, injuring two coolies.	...	2
18	7th Sept. 1907.	Explosive bullet.	Calcutta ...	The Commissioner of Police reported that a native employed at Messrs. Rodda & Co., in making explosive bullets, while swedging an explosive bullet containing powder seems, to have, by mistake, put a bullet into too small a sized swedge where it got stuck and in trying to pull the bullet out it burst injuring him in the arm.	...	1
				TOTAL ...	...	4
19	7th Mar. 1907.	Fireworks ...	Poona ...	The District Magistrate reported that some natives were manufacturing fireworks, the ingredients of which are not known, and while one of the men was ramming some of the ingredients into a bamboo tube with a small iron bar, an explosion occurred, killing three of the men.	3	...
20	30th May 1907.	Do. ...	Bombay ...	The Commissioner of Police reported that about 1 P.M. flames were seen coming down from a godown over a shop where fireworks were stored. The fire soon spread and three shops were completely gutted and the upper storeys of two other shops partially damaged. A report was current that the man who was in charge of the shop at the time lit a *biddie* or cigarette and threw the match amongst matches lying on the ground, but this report could not be substantiated.	...	...
21	11th June 1907.	Do. ...	Calcutta ...	The Commissioner of Police reported that some coolies were employed in manufacturing bombs and after mixing the ingredients which consisted of nitrate of strontium, nitrate of barium, sulphate of copper, sulphur and chlorate of potash, a portion of the mixture was taken to a shop and put on trestle inside, and about two hours after a noise was heard inside the shop and a blaze seen. Two men seated on the verandah of the shop were killed by the explosion and three of the neighbouring shops were burnt down, and three coolies, who were close by, were injured.	2	3

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons.	
					Killed.	Injured.
				Explosives—*continued.*		
22	25th Sept. 1907.	Fireworks ...	Calcutta, Bagan.	Seth A native was holding a firework bomb in his hand and finding the paper enclosing it loose he twisted it in order to tighten it with the result that the bomb exploded causing injuries to his right hand.	...	1
23	4th Oct. 1907.	Do. ...	Tuni ...	The District Magistrate, Godaveri, reported that while a native was carelessly mixing some sulphide of arsenic and chlorate of potash an explosion occurred and the man was killed on the spot.	1	...
24	15th Oct. 1907.	Do. ...	Calcutta ...	The Commissioner of Police reported that a native had sustained injuries from an explosion of a firework consisting of saltpetre, sulphur, charcoal and iron filing which was discharged by another native.	...	1
25	16th Oct. 1907.	Do. ...	Do. ...	The Commisssoner of Police reported that a native lad sustained injuries from the explosion of a bomb consisting of chlorate of potash, realgan and pieces of stone which was discharged by another native.	...	1
26	30th Oct. 1907.	Do. ...	Bombay ...	The Commissioner of Police reported that while a native was mixing fireworks composition consisting of red arsenic and chlorate of potash an explosion occurred, so seriously injuring the man that he died shortly after.	1	...
27	31st Oct. 1907.	Do. ...	Do. ...	The Commissioner of Police reported that four men were manufacturing detonators when an explosion occurred, so severely injuring one of them that he died. Red arsenic and detonators were found on the premises, but no trace of any chlorate of potash.	1	...
28	2nd Nov. 1907.	Do. ...	Calcutta ...	The Inspector of Police reported that a native lad sustained injuries from the explosion of a bomb consisting of chlorate of potash, sulphide of arsenic and pieces of stone.	...	1
29	5th Nov. 1907.	Do. ...	Do. ...	The Commissioner of Police reported that a native who had some firework composition consisting of chlorate of potash and sulphide of arsenic in a phial in his left hand was striking some of the composition placed on a stone with another stone in the other hand, when the composition exploded and a spark entering the phial exploded its contents and all the fingers of his left hand were torn away. Another native, who was near by, was also injured.	...	2
30	6th Nov. 1907.	Do. ...	Do. ...	The Inspector of Police reported that while a native was pounding some chlorate of potash, sulphur and sulphide of arsenic in a stone vessel with an iron pestle the composition exploded injuring him.	...	1
31	5th Nov. 1907.	Do. ...	Bombay ...	The Commissioner of Police reported that a native girl was playing with fireworks when her clothes caught fire and she was so severely burnt that she died from the effects.	1	...
32	6th Nov. 1907.	Do. ...	Calcutta ...	The Commissioner of Police reported that a native kept some powder in a piece of paper on the roof of his house, a bomb accidently fell from his hand on to the roof and when he attempted to pick up the powder the bomb exploded and set fire to the powder which burnt his face and chest.	...	1
33	Do. ...	Do. ...	Do. ...	The Commissioner of Police reported that a native was seen cooking his food and seated 3 feet away from the stove making a bomb consisting of chlorate of potash and sulphide of arsenic. He was rolling some paper round a bomb and squeezing it when it exploded and killed him on the spot.	1	...
34	7th Nov. 1907.	Do. ...	Do. ...	The Commissioner of Police reported that a native was manufacturing bombs consisting of chlorate of potash, sulphide of arsenic and small stones, when one of the bombs exploded, injuring him.	...	1
35	9th Nov. 1907.	Fireworks consisting of chlorate of potash and red arsenic.	Nadia ...	The Magistrate reported that a native lad opened a number of bombs and put the contents into a metal tube and while pressing the ingredients with a bamboo stick an explosion occurred and injured the lad.	...	1

No.	Date of accident.	Nature of explosives.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons Killed	Injured
				Explosives—*continued.*		
36	31st Oct. 1907.	Chinese Crackers.	Godhra	... The Superintendent of Police reported that while a native was carrying a box of fireworks, it accidently fell to the ground causing an explosion of its contents and fatally injuring the man.	1	...
37	3rd Nov. 1907	Bomb consisting of chlorate of potash and sulphide of arsenic and small stones.	Allanmyo	... The Local Government reported that a Burman threw a bomb into the midst of a crowd that had collected on the bank of the river and notwithstanding the entreaties of the people on the bank he threw a second one which also exploded and did further damage.	1	7
				TOTAL ...	12	20

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons Killed.	Injured.
				Petroleum.		
38	19th Feb. 1907	Bomb consisting of chlorate of potash and sulphide of arsenic and small stones.	Crude oil ...	At about 9-45 P.M. one of the wells of the Assam Oil Company had just given a blow of oil. A native was walking past and quite close to the well at the time with a naked lamp, when the lamp ignited the gas and the oil which had flowed out flared up. The native was fatally injured and it was not till 5 the next morning that the oil had burnt itself out.	1	...
39	26th Mar. 1907	Petroleum ...	Kabat ...	The Field Manager of the Burma Oil Company reported that the men were working about the oil well as usual when suddenly the water broke in from behind the pipe which released a gas vein that had been shut off by the pipe and considerable volume of gas appeared at the top of the bore, caught fire immediately, and before the men could all get away two coolies who were working in the cellar under the derrick were burned.	...	2
40	23rd April 1907	Kerosine ...	Ranaghat ...	The Magistrate reported that a bulk oil tank wagon caught fire through a native putting a hurricane lamp in at night through the roof-door to ascertain the quantity of oil in it.	...	1
41	13th May 1907	Do. ...	Bársi Road ...	The District Magistrate reported that a railway tank wagon was being emptied and about 9 P.M. a native with a lantern was seen moving in the vicinity of the tank. An explosion occurred setting fire to the tank and in time the fire spread to the drums of oil removed from the tank.	...	2
42	11th Aug. 1907	Kerosine and Tar.	Bombay Harbour...	The Commissioner of Police reported that at about 4-45 P.M., 12th August 1907, information was received that a fire had broken out on the steam mud boat "Pholas," which was lying alongside the Harbour Wall, opposite "K" shed, Prince's Dock. 2. From enquiries made as to the cause of the fire, the Commissioner was of opinion that some of the crew of the mud boat "Pholas" must have been smoking and set fire to the canvas purdah. The fire then spread to the jolly boat, which was hanging to the stern and was thickly coated with pitch, tar, oil and black varnish. The burning pitch and tar, etc., streamed off the boat and fell into the sea. 3. At the time it was noticed that there was a quantity of kerosine oil floating on the sea, from about $\frac{1}{4}$" to $\frac{1}{2}$" deep and this, coming in contact with the burning tar that was falling, caused a great conflagration, which caught hold of the stern of the "Pholas" and slightly burnt it. The fire, which was then burning on the top of the water, gradually floated down and came in contact with another mud boat "Curlew" singeing her stern a little. The fire went out at about 5-15 P.M. 4. Further enquiries were made as to the cause of the kerosine oil floating on the top of the water, and it was ascertained that there was a quantity of kerosine oil running into the sea through a drain at the Wari Bunder.	...	...

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			Petroleum—*concluded.*			
				The drain was traced to about the middle of the Bunder, where it was found that a large quantity of oil was leaking, most probably from the oil main pipe running near by; and the oil found its way to the drain, which emptied itself into the sea at the same Bunder. 5. There appeared to have been a leakage in the main oil pipe, which runs from Stone Bunder to Sewri.		
43	2nd Oct. 1907	Crude Petroleum.	Yenangyat ...	Two women were endeavouring to fill a lighted Burmese hand lamp from a kerosine tin containing crude petroleum when an explosion occurred; they were both fatally injured.	2	...
44	17th Oct. 1907	Kerosine ...	Bombay ...	The Commissioner of Police reported that a tin of kerosine oil which was kept on the threshold of a shop caught fire and was thrown into the street. Unfortunately the tin fell near where two native children were playing and the burning oil splashing on them set fire to their clothes. They were severely burnt, and one of the children died from the effects. No reason could be assigned for the cause of the fire.	1	1
45	18th Oct. 1907	Do. ...	Pandigon ...	The Sub-Divisional Officer, Magwe, reported that a cooly during the process of pouring oil on to a fire underneath a pipe to make it bend carelessly allowed the oil in the cup from which he was pouring it to catch fire. The fire caught his clothes which burnt him so severely that he succumbed to the injuries.	1	...
46	25th Oct. 1907	Do. ...	Bombay ...	The Commissioner of Police reported that a native lad was purchasing some potatoes from a hawker with a handcart who was standing on the road side. The scales used for weighing accidently upset a kerosine oil lamp which fell on the lad, setting his clothes on fire and burning him severely.	...	1
47	5th Nov. 1907.	Do. ...	Do. ...	The Commissioner of Police reported that while a native was lighting a kerosine oil stove it suddenly caught fire. He picked it up for the purpose of carrying it outside, when his clothes caught fire and he was severely burnt.	...	1
48	6th Nov. 1907.	Petrol ...	Bombay Harbour ...	The Commissioner of Police reported that a boat laden with 1,500 4-gallon and 4,500 2-gallon tins of petrol was fastened to a landing stage about 11 P. M. when, a few minutes after, an explosion took place and the barge was enveloped in flames. Soon after the explosion, the barge left her moorings and began to drift towards and came alongside Coal Bunder; some of the blazing tins were shot on to the coal and very soon three stacks were ablaze. The oil burnt itself out about 11 A. M. next morning. The crew stated that no matches or fire of any description was on board, but it is probable that a lascar who went in the hold of the boat and who was killed must have lit a match to look for something or to light a *biddi*.	1	...
49	12th Nov. 1907.	Kerosine ...	Bombay ...	The Commissioner of Police reported that a fire broke out in a hut, through a native woman accidentally upsetting a kerosine lamp.	...	...
50	18th Nov. 1907.	Petrol ...	Budge Budge ...	The Commissioner of Police reported that a wooden cargo boat laden with 3,310 drums of dangerous petroleum caught fire. The boat was tied to a buoy and the fire was attributed to another cargo boat with a fire burning on it coming along side the same buoy. The boat burnt itself and no lives were lost.	...	...
51	20th Nov. 1907.	Kerosine ...	Bombay ...	The Commissioner of Police reported that a European lady was trying to make a fire and poured some kerosine oil on to a stove and in applying a match the oil flared up and set her clothes on fire. She was burnt so severely that she died from the effects.	1	...
52	30th Nov. 1907.	Do. ...	Calcutta ...	The Inspector of Police reported that two native girls evidently were playing with a box of matches near a tin of kerosine oil when, it is believed, one of them threw a lighted match into the tin of oil which caught fire. The girls' clothing caught fire, which burnt them so severely that they died from the injuries.	2	...
				TOTAL ...	9	8

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons Killed	Injured.
				Miscellaneous.		
53	9th Mar. 1907.	Methylated spirits.	Broach ...	An explosion occurred in the oil room of the Bombay, Baroda and Central India Railway at Broach fatally injuring one man. At the time of explosion there was an open castor oil lamp burning in a room about 10 feet distant from a tin containing methylated spirits. Through the top of the tin a small hole was drilled to take out the spirit as required, but this at the time of the explosion is said to have been lightly plugged with cotton waste and sealed.	1	...
54	14th Sept. 1907.	Safety Bengal light matches.	Prince's Dock, Bombay.	Three cases of safety Bengal light matches ignited while being lowered from a steamer to the wharf. One of the cases was completely burned. The cause of the fire is attributed to friction.	...	...
55	23rd Sept. 1907.	Sulphur matches.	Bombay ...	Some cases of sulphur matches were being moved from the ground floor of a 3-storied house in Nagdivi Street and two coolies were rolling a case across the floor when the case suddenly burst into flames. The other cases got ignited and in a few minutes the whole place was on fire. The whole house was considerably damaged before the fire was extinguished. One of the coolies only was injured.	...	1
56	26th Sept. 1907.	Spirits of wine.	Calcutta ...	The Commissioner of Police reported that a servant was warming some milk on a spirit stove near which a native girl was playing. As the stove was burning dimly the servant poured some spirit into the reservoir which blazed up, burning her hands and burning the child, who subsequently died from the injuries.	1	1
57	10th Oct. 1907.	Rum ...	Sukkur ...	The District Magistrate reported that a cask of rum was being emptied, and when a hole was bored in the cask which was only a few feet from a lighted hurricane lamp the rum flowed out and a clerk put his hand out to stop the flow and some rum passed through his hand on to the lamp which flared up with a slight explosion. Water and sand were thrown on the flames rising from the rum as it escaped from the barrel; and another explosion occurred from the cask fatally injuring five people that were near by.	5	...
58	12th Nov. 1907.	Umber, potash, manganese, antimony, etc.	Bombay ...	The Commissioner of Police reported that a fire took place in the mixing and weighing room of the Bombay Match Manufacturing Co., where umber, potash, lamp black, manganese, antimony, glass powder were stored. When weighing out the ingredients a certain portion falls to the ground and becomes mixed and it is presumed that an employé must have caused some friction amongst the loose mixture causing it to ignite.	...	...
				TOTAL ...	7	2

Summary of accidents during the year 1907.

Kind of explosive or dangerous and inflammable substance.	Accidents causing loss of life and bodily injury.			Accidents not causing loss of life, or bodily injury.	Total number of accidents.
	No. of accidents.	No. of persons			
		Killed.	Injured.		
Explosives.					
Gunpowder ...	9	18	20	2	11
Nitro-compounds ...	4	...	6	...	4
Ammunition ...	3	...	4	...	3
Fireworks ...	18	12	20	1	19
Total ...	34	30	50	3	37
Petroleum.					
Petroleum generally ...	12	9	8	3	15
Total ...	12	9	8	3	15
Chemicals ...	...	...	...	...	...
Total ...	...	...	...	...	...
Miscellaneous ...	4	7	2	2	6
Total ...	4	7	2	2	6
GRAND TOTAL ...	50	46	60	8	58

APPENDIX D.

Detailed statement showing the number of accidents and persons killed and injured during the five years 1903 to 1907.

Year.	Gunpowder.			Dynamite and other nitro compound explosives.			Ammunition.			Fireworks.		
	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No of accidents.	Persons killed.	Persons injured.
1903 ...	5	9	1	7	5	18	...	...	...	20	8	25
1904 ...	11	25	30	5	3	10	1	...	1	18	10	9
1905 ...	7	6	3	10	6	19	...	...	...	15	13	26
1906 ...	13	21	28	2	1	2	...	...	...	11	4	14
1907 ...	11	18	20	4	...	6	3	...	4	19	12	20
Total ...	47	79	82	28	15	55	4	...	5	78	47	95
Average ...	9	16	16	5	3	11	1	...	1	15	9	19

Year.	Petroleum.			Chemicals.			Miscellaneous.		
	No of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons njured.
1903 ...	9	13	14	2	6	3	...	...	...
1904 ...	8	42	10	4	...	9	5	...	1
1905 ...	12	7	13	...	...	...	...	...	...
1906 ...	10	9	3	...	...	...	3	1	1
1907 ...	15	9	8	...	...	...	6	7	2
Total ...	54	80	48	6	6	12	14	8	4
Average ...	11	16	10	1	1	2	3	1	1

APPENDIX E.

Comparative statement showing number of accidents and persons killed and injured during the five years 1903 to 1907.

Year.	Accidents causing loss of life or bodily injury.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons			
		Killed.	Injured.		
1903	35	41	62	8	13
1904	40	80	70	7	47
1905	40	32	61	4	44
1906	34	36	48	5	39
1907	50	46	60	8	58
TOTAL ...	199	235	301	32	201
AVERAGE ...	40	47	60	6	40

APPENDIX F.

Statement showing the import of explosives by sea into British India from other countries in the year 1907.

		Imports in 1907.						
		Bengal.	Bombay.	Sind.	Madras.	Burma.	Eastern Bengal and Assam.	Total.
Quantity.								
Gunpowder, black	Lbs.	43,260	90,120	1,750	33,269	2,500	...	170,299
Do. smokeless	,,	2,575	4,100	20,092	1,775	775	...	29,317
Dynamite	,,	149,968	40,000	32,527	...	40,000	...	2,62,495
Blasting Gelatine	,,	...	6,000	24,000	1,055,050	..	...	1,085,050
Gelignite or Gelatine Dynamite ...	,,	5,040	...	...	170,000	...	...	175,040
Monobel powder	,,	...	...	...	...	...	...	...
Other nitro-compound explosives ...	,,	88,256	1,000	...	...	...	...	89 256
Detonators	Nos.	...	60,000	90,000	2,844,000	58,400	...	3,052 400
Fireworks	Lbs.	...	2,304,178	14,848	58,979	68,425	..	2,446,428
Total ...	Lbs.	289,099	2,445,398	92 615	1,319,073	111,700	..	4,257,885
Total ...	No.	...	60,000	90,000	2,844,0 0	58,400	...	3,052,400
Value in Rupees.								
Gunpowder, black	Rs.	36,250	41,528	462	14,405	2,980	...	95,625
Do. smokeless	,,	7,983	15,682	22,659	5,900	2 820	...	55,044
Dynamite	,,	1 21,488	31,800	19,303	...	32,500	...	2,05,091
Blasting Gelatine	,,	...	5,740	20,241	9,97,794	...	...	10,32,775
Gelignite or Gelatine Dynamite ...	,,	4,044	...	...	1,34,397	...	...	1,38,441
Monobel powder	,,	...	...	...	...	...	...	...
Other nitro-compound explosive ...	,,	52,208	730	...	...	...	...	52,938
Detonators	,,	14,503	945	2,902	54,854	1,090	...	74,474
Fireworks	,,	16,411	5,00,578	9,306	18,000	16,792	...	5,61,087
Total ...	Rs.	2,52,977	5,97,003	83,963	12,25,350	56,182	...	22,15,475

APPENDIX G.

Comparative statement showing the import of explosives by sea into British India from other countries during the years 1903 to 1907.

		Imports in				
		1903.	1904.	1905.	1906.	1907.
Gunpowder, black	Lbs.	272,423	473,925	202,751	168,353	170,299
Gunpowder, smokeless	,,	31,004	48,246	45,125½	39,745	29,317
Dynamite	,,	416,480	149,968	249,968	352,207	262,495
Blasting Gelatine	,,	843,432	895,040	558,200	906,400	1,085,050
Gelignite or Gelatine Dynamite	,,	22,926	55,048	123,048	132,594	175,040
Monobel powder	,,	.....	.....	.....	2,000	.....
Other nitro-compound explosives	,,	222,104	130,811	109,475	72,921	89,256
Detonators	No.	4,388,400	3,020,000	1,797,000	5,536,000	3,052,400
Fireworks	Lbs.	1,971,317½	2,264,162	1,661,229	2,410,388	2,446,428
Total ...	Lbs.	3,778,856½	4,017,200	2,949,796½	4,084,608	4,257,885
Total ...	No.	4,388,400	3,020,000	1,797,000	5,536,000	3,052,400

APPENDIX H.

Statement showing the quantity of petroleum imported by sea into British India during the years 1905 to 1907.

Non-dangerous petroleum.

	1905.	1906.	1907.
	Gallons.	Gallons.	Gallons.
Chittagong	3,970,269	1,822,051	5,547,944
Balasore	10,000	26,200	.....
Chandbali	367,500	405,000	270,200
Calcutta	27,144,014	20,342,078	27,842,923
Bombay	22,099,928	17,402,913	22,439,071
Sind	5,157,947	5,007,932	7,171,933
Madras	9,765,384	6,956,459	8,942,869
Burma	1,595,209	1,156,179	1,828,973
TOTAL ...	70,110,251	53,118,812	73,543,913

Dangerous petroleum.

	1905.	1906.	1907.
	Gallons.	Gallons.	Gallons.
Chittagong	.....	.....	.....
Balasore	.....	.....	.....
Chandbali	.....	.....	.....
Calcutta	14,500	.....	12,270
Bombay	66,017	184,243	92,258
Sind	622	9,795	2,733
Madras	7,828	38,104	25,400
Burma	5	.....	.....
TOTAL ..	88,972	232,142	132,661

Statement showing the quantity of petroleum produced in Assam and Burma during the years 1905 to 1907.

Non-dangerous petroleum.				Dangerous petroleum.			
	1905.	1906.	1907.		1905.	1906.	1907.
	Gallons.	Gallons.	Gallons.		Gallons.	Gallons.	Gallons.
Assam ...	1,543,212	1,890,942	1,975,094	Assam ...	21,014	21,855	48,017
Burma ...	67,062,170	95,848,500	75,397,762	Burma ...	11,988,220	125,356,400	15,043,700
TOTAL ...	68,605,382	97,739,442	77,372,856	TOTAL ...	12,009,234	125,378,255	15,091,717

APPENDIX I.

DEPARTMENT OF EXPLOSIVES

NOTIFICATION.

Dated Calcutta, the 12th March 1908.

No. 494.—With reference to Notification No. 4555—4, dated the 31st May 1907, of the Government of India, Department of Commerce and Industry, publishing rules to regulate the transport and importation of explosives, the following list of "authorized explosives" referred to in rule 9 (1) of the above rules is published for general information :—

LIST OF AUTHORIZED EXPLOSIVES.

The following explosives are at present authorized for importation into British India for general sale :—

Class 1.—GUNPOWDER

GUNPOWDER.

Class 2.—NITRATE MIXTURE.

AMMONAL.

RIPPLENE.

Class 3.—NITRO-COMPOUND.

Every explosive in this class and every explosive ingredient thereof shall be so thoroughly purified and otherwise of such character as to satisfy a test known as the heat test, and specified in the rule for testing explosives, published with Notification No. 4555—4, dated the 31st May 1907, referred to above.

Division 1.

ALBIONITE.
AMBERITE No. 1.
BALLISTITE.
BLASTING GELATINE.
CARBONITE.
CELTITE.
CORDITE.
CORDITE, M. D.
DYNAMITE.
GELATINE DYNAMITE No. 1.
GELATINE DYNAMITE No. 2 OR GELIGNITE.
MONOBEL POWDER.
PHŒNIX POWDER.

Provided that every explosive in this division shall be of such character and consistency as not to be liable to liquefaction or exudation.

Division 2.

AMBERITE No. 2.
AMMONITE.
COOPPAL'S POWDER.
E. C. SPORTING POWDER.
EMPIRE POWDER.
GUNCOTTON.
HENRITE.
SCHULTZE GUNPOWDER.
KYNOCH'S SMOKELESS SPORTING POWDER.
NEGRO POWDER.
PICRIC ACID.

PICRIC POWDER.

RIFLEITE.

ROBURITE.

S. R. POWDER.

S. S. POWDER.

SMOKELESS POWDER.

SMOKELESS BLASTING POWDER.

Class 4.—CHLORATE MIXTURE.

Nil.

Class 5.—FULMINATE.

Nil.

Class 6.—AMMUNITION.

Division 1.

SAFETY FUZES FOR BLASTING.
SAFETY ELECTRIC FUZES.
PERCUSSION CAPS.
RAILWAY FOG SIGNALS.
SAFETY CARTRIDGES.

Division 2.

CARTRIDGES FOR CANNON, SHELLS, MINES, BLASTING OR OTHER LIKE PURPOSES.
CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.
ELECTRIC FUZES.
FUZES FOR BLASTING WHICH ARE NOT SAFETY FUZES.
FUZES FOR SHELLS.
TUBES FOR FIRING EXPLOSIVES.
WAR ROCKETS.

Division 3.

CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.

DETONATORS.

ELECTRIC DETONATORS.

FUZES FOR BLASTING WHICH ARE NOT SAFETY FUZES.

FRICTION TUBES.
FUZES FOR SHELLS.

FUZES FOR FIRING EXPLOSIVES.

Class 7.—FIREWORK.

Division 1.

Nil.

Division 2.—Manufactured Fireworks.
MANUFACTURED FIREWORKS.
AMORCES.
CHINESE CRACKERS.

F. G. SMALLWOOD, *Major, R.A.,*
Offg. Chief Inspector of Explosives in India.

BOMBAY: PRINTED AT THE GOVERNMENT CENTRAL PRESS.

Indian Explosives Act (IV of 1884)

Indian Petroleum Act (VIII of 1899)

TENTH ANNUAL REPORT

OF THE

CHIEF INSPECTOR OF EXPLOSIVES IN INDIA.

BEING HIS

Annual Report for the Year ending 31st March 1909.

CALCUTTA:
OFFICE OF THE SUPERINTENDENT, OF GOVERNMENT PRINTING, INDIA
1909.

Price—Twelve Annas.

Tenth Annual Report of the Chief Inspector of Explosives, India.

No. 1067.

FROM

LIEUT.-COLONEL C. A. MUSPRATT-WILLIAMS, R.A.,
Chief Inspector of Explosives in India

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,
DEPARTMENT OF COMMERCE AND INDUSTRY.

Simla, the 17th June 1909.

SIR,

I have the honour to submit herewith a Report of the work of my Department during the year ending 31st March 1909.

Personnel.

2. From the 1st of March to the 6th of November 1908 Major F. G. Smallwood, M.V.O., R.A., was officiating for me while I was on furlough, and I returned from furlough and took up the duties of my appointment on the 7th of November 1908. Captain J. S. Rush, Inspector of Explosives, was granted three months' privilege leave to England from the 28th March 1908 and reported himself for work again on 28th June.

Number of magazines.

3. During the year 1908, 134 licenses (or 8 more than in the previous year) were granted in British India under Rule 17 of the rules to regulate the manufacture, possession and sale of explosives. The number of magazines licensed was 186, or 13 more than in 1907, and is in excess of the number of licenses granted, because in a number of cases firms have two or more magazines in one place under one license. A statement showing the number and location of the magazines and also the number of licenses granted in British India is given in Appendix A. It will be seen from this statement how widely dispersed these magazines are, and how in some cases they are situated in places very difficult of access, and consequently considerable time has to be spent in getting from place to place, which necessarily, to a certain extent, curtails the number of inspections that can be made during the year.

Inspection of explosives magazines during the year.

4. During the year 268 inspections of magazines were made; a number of magazines being inspected two or three times each. Those magazines are inspected most frequently which are situated in the neighbourhood of towns or in populous localities, or which contain large quantities of explosives, or any explosive, which on account of its greater susceptibility to decomposition and consequent ignition, it is considered advisable to examine and test more than other explosives. The Roburite Factory at Karachi was also inspected twice.

Condition of magazines.

5. The magazines generally are in good order and as usual I have found magazine owners most willing to carry out recommendations even when involving considerable expense and my thanks are due to them for making my duties easy in this respect.

6. The physical condition of all the explosives in the different magazines during the year was found to be good with the following exceptions, which were found to have deteriorated or to have become defective and were destroyed.

Condition of explosives in magazines.

(*a*) 2 cases of Amberite and 3 cases Canonite from the Calcutta Port Commissioners' magazine at Moyapur.

(*b*) 496 Coils of Safety Fuze in Messrs. Gillanders Arbuthnot and Company's magazine at Giridih;

(*c*) 1,176 Coils of Safety Fuze from Messrs. Shaw Wallace and Company's magazine at Goondhoodi in Bengal;

(*d*) 375 lbs. of Ballistite from Messrs. Best and Company's magazine at Madras;

(*e*) 10 lbs. of Dynamite, a few Cartridges Gelignite and Blasting Gelatine and 1,500 Electric Detonators from Messrs. Gillanders Arbuthnot and Company's magazine at Bally;

(*f*) 550 lbs. Dynamite and 1,500 Coils Safety Fuze, which had been stored for a long time in the Raipur District and for which there had been no use, and the owner asked that the explosives might be destroyed, which was carried out by this Department;

(*g*) 60 lbs. Amberite from the Bombay Port Trust magazine;

(*h*) a few cartridges Carbonite, Dynamite and Gelignite and 102 coils Safety Fuze from the Gaya-Katras Railway magazine at Patwas;

(*i*) 106 Coils Safety Fuze and 82 Detonators from the magazine of Messrs. P. C. Dutt and Burn and Company at Imalya, Central Provinces.

7. During the year 2 cases of thefts were reported to this Department. The magazine of Messrs. Murray and Company at Lucknow was broken into in June 1908 and 50 lbs. of Amberite, 25 lbs. Diamond Smokeless Powder, 25 lbs. No. VI black gunpowder and 21 lbs. F. F. F. Powder were stolen. The magazine of Messrs. F. F. Christien and Company at Barakura in the Hazaribagh District was reported as broken into in February last, and 150 lbs. Dynamite and 57 coils of fuze were stolen. It will be seen from my Seventh Annual Report in paragraph 7 that the same magazine has been broken into before and explosives stolen. In paragraph 7 of my Ninth Annual Report it will be seen also that the same firm had another magazine at Dhab in the same district broken into and explosives were removed, and that explosives were also taken from another firm's magazine situated in this same district. All these robberies seem to occur in the Hazaribagh district, and I am of opinion that the explosives so obtained command a ready sale amongst some of the small mine owners who will not go to the trouble or expense of taking out a license for the possession of explosives, and who prefer to buy stolen explosives at a cheaper rate than the market rate. I have made certain suggestions to the Government of India for the better control and safe guarding of magazines in general.

Thefts from magazines.

8. During the year under report 444 licenses for the storage of non-dangerous petroleum, regarding which this Department has been concerned or consulted, were granted. This is an increase of 33. A list of these installations, corrected up to date, and showing the districts in which they are located, is given in Appendix B. In addition, of course, there are a number of storage godowns for the possession of non-dangerous petroleum in non-bulk, licensed by District officers of which this Department has no cognizance.

Number of petroleum installations.

9. During the year the Chief Inspector of Explosives personally visited the large bulk oil installations at Madras, Karachi, Bombay, Tuticorin, Calcutta (Budge Budge and Narculdanga), Chittagong and Rangoon and also the oil fields of Burma and Assam. He in addition inspected a number of the minor installations. In all 492 petroleum inspections were made. Thirty

Inspection of petroleum installations during the year.

dangerous petroleum godowns were also inspected by this Department during the year.

Condition of major installations.

10. The large installations are usually under efficient European supervision and are in good order and well looked after. In paragraph 10 of this Department's Ninth Annual Report, it was stated that there was still one grave defect in the conception of these installations, inasmuch as there was no provision for a safety or emergency tank right away from the oil area. This opinion given by Major Smallwood I do not share, for I adhere to the decision I arrived at five years ago after due and serious consideration that it was unnecessary to insist on the provision of these emergency tanks. The petroleum rules in India lay down that in major installations the tanks shall be 100 feet apart and shall be each surrounded by an embankment capable of containing more than the contents of the tank. With these precautions I consider that, in the event of a fire breaking out in any particular tank, it should be easily localised by spraying water on the other tanks to keep them cool. The firms find it difficult enough as a rule to obtain sufficient ground for their installations, and the difficulty would be very greatly increased, if they had to provide an emergency tank right away from the oil area. The provision of a large tank, always standing empty waiting for an accident, would mean considerable expense to the oil firms. Moreover there would always be a risk in the excitement of a fire of the oil being pumped into less desirable places than the emergency tank, and there is also always a chance of leakage in a long pipe line. When I was in England I took the opportunity to consult Sir Boverton Redwood, the eminent petroleum specialist, who is the petroleum adviser to the Home Office, the India Office, and the Admiralty. He told me he considered our petroleum rules in India were practicable and quite stringent enough and gave an ample margin of safety and that the provision of emergency tanks was absolutely unnecessary. He was also good enough to say that he would corroborate this opinion if it was referred to him officially.

Condition of small bulk oil installations.

11. The small or minor installations are installations in which not more than 50,000 gallons of kerosine oil are stored and are looked after by native Agents, employed by the large oil firms. The oil for these installations is supplied from the major installations, and the retail trade is carried out in them. A great deal of inspection of these minor installations has been done by this Department during the last three years with the result that their condition is very much improved.

Oil trade expansion.

12. In Burma considerable competition has arisen in the oil fields. Messrs. Jamal Brothers of Rangoon, who have oil well sites in the Khodoung oil fields, have started a Company and have combined with Messrs. Steel Brothers of Rangoon under the name of the Indo-Burman Company. This Company has erected a refinery on the Rangoon River, and has already imported case oil into Calcutta. A retired durwan of the Burma Oil Company bought a number of sites some time ago in the Khodoung field, and a Company has been formed to exploit these sites under the name of the Nath Singh Oil Company. The Rangoon Refineries Company have very nearly completed a refinery on the Rangoon River, where I believe it is intended to refine the oil of the Nath Singh Company. I hear also that lately another large Company, the Twinzas Oil Company, has been floated. As will be seen from the increase in the number of licenses, there have been a number of new installations constructed during the year, and the number is likely to expand considerably.

Accidents.

13. No accidents have occurred in the magazines or in the one explosives factory (The Roburite Factory at Karachi) licensed in British India. A list of accidents that have occurred with explosives, inflammable substances, dangerous goods, etc., between the 1st January and 31st December 1908, and that have been reported to this Department, is given in Appendix C and gives a short account of each one. It will be seen from a perusal of the details that the accidents have practically all been caused by gross neglect of ordinary precautions. In all there were 98 accidents causing 93 deaths and injuries to 112 persons. Comparative

statements given in Appendices D and E show the total number of accidents and the number of persons killed or injured by them during the last five years. As stated in my previous reports, it is doubtful whether all accidents that occur are reported to this Department, and therefore it is possible that the statistics given are underestimated.

Gunpowder, Class I.

14. There were 19 gunpowder accidents during the year, causing 27 deaths and injuries to 64. This big quota of victims is due to one accident (Serial No. 9 of Appendix C) at Mymensingh, which was responsible for 17 deaths and injuries to 43 persons and which illustrates the proverbial carelessness that prevails.

Nitro-Compounds, Class III.

15. Nitro-Compounds were responsible for 4 accidents causing 1 death and injuries to 4 persons.

Ammunition, Class VI.

16. Carelessness with detonators caused severe injuries to a European. (Serial No. 24 of Appendix C).

Fireworks, Class VII.

17. Twenty-two accidents from fireworks were reported to this Department, causing 26 deaths, and injuries to 23 persons. Most of the accidents are caused by the sulphur chlorate combination of fireworks which is an extremely sensitive one and which is prohibited in England.

I recommended their prohibition in India in 1899, but the Government of India after due consideration of all the points at issue decided not to prohibit these fireworks in India. The question of their prohibition is now again under the consideration of the Government of India, as this mixture has been very considerably used in bombs.

Petroleum.

18. There were 41 accidents from petroleum during the year, which were responsible for 37 deaths and injuries to six persons. It will be seen from the details of these accidents given in Appendix C (Serial Nos. 47 to 87), that carelessness is a prominent feature in a large number of them and that they are caused usually by lights being brought into proximity to oil vapour, to kerosine lamps being upset or falling down from walls, to kerosine being poured on to fires or into burning lamps. One bad accident (Serial No. 86) causing the death of six employés occurred at one of the Assam Oil Company's flowing oil wells at Digboi. Work had been finished for the day and the well had been boxed over. The coolies were cleaning themselves preparatory to going home, and the driller in charge had gone to the boiler 164 feet away to make sure that all was safe for the night when the well suddenly blew. There was a sudden conflagration accompanied with an explosion and the men cleaning themselves were caught in it though the men at the boiler were untouched, from which it is practically certain that the fire was not occasioned by the boiler. The Manager of the Company seemed to think the fire must have been started by a spark from the boiler chimney, but I am personally inclined to think it was due to some carelessness on the part of the coolies. I submitted a special report on the accident to the Local Government concerned and made a number of recommendations, which I trust will minimize the chance of a disaster of this kind occurring again.

Government accidents.

19. Particulars were received by this Department during the year of 3 Government accidents, which were responsible for 29 deaths and injuries to 13. A very serious explosion which occurred in a building in the Dum Dum Ammunition Factory where the uncapping of Martini-Henri cartridges was being carried out, caused 28 of these deaths and 11 employés were also injured. A special departmental enquiry was held to investigate the circumstances of the explosion.

Import of Explosives.

20. One thousand five hundred and sixty tons of explosives were imported into British India during the year 1908, the value being Rs. 18,24,657. Full details showing the different kinds of explosives imported and the value of each are given in Appendix F. A comparative statement showing the quantity of explosives imported during the last five years is given in Appendix G.

Import of Petroleum.

21. During the year under report 209,995 gallons of dangerous petroleum and 90,626,195 gallons of non-dangerous petroleum were imported by sea into British India. The details are given in Appendix H, and also the quanity of dangerous and non-dangerous petroleum produced in Assam and Burma during the year.

Completion of first decade of the Department.

22. This Department has now been in existence ten years having started in September 1898 and I hope it may be considered to have justified its formation. It began somewhat humbly with the Chief Inspector of Explosives and 2 clerks and only dealt with explosives. For the first year or so the work was light as the Department was hardly known. The functions of the Department, however, soon enlarged and it had soon to deal also with all questions relating to petroleum and dangerous goods of all kinds and to carry out inspections of all petroleum installations. In fact the Department has become a bureau, from which information on all these subjects can be obtained. The establishment now consists of a Chief Inspector and two Inspectors of Explosives and 8 clerks and even with the increased establishment it is difficult to cope wit hthe increase of work. Prior to the formation of this Department there were explosives and petroleum rules in existence, but it cannot be said that they were satisfactory, and the magazines and installations that existed under these rules were certainly in a very bad state as the local officers, who carried out the inspections, had no technical knowledge. Since then uniform rules for the whole of British India for explosives, petroleum and carbide of calcium have been issued, laying down clearly the conditions which have to be observed and allowing modifications or variations for special cases at the recommendation of the Chief Inspector of Explosives, so that the conditions are not unnecessarily rigid.

Outrages.

23. During the last 18 months this Department has had very onerous, unpleasant, and dangerous work to do in connection with the anarchist outrages, which started with the attempt on the 6th December 1907 to derail the special train of His Honour the Lieutenant-Governor of Bengal. In connection with these outrages, Major F. G. Smallwood, M.V.O., R.A., who was acting for me for eight months, had an extremely arduous and anxious time, and this Department is also much indebted for able assistance to Major J. A. Black, M.A., M.B., I.M.S., Chemical Examiner to the Government of Bengal, and after his departure to Captain H. Elmslie Smith, M.B., I.M.S., his *locum tenens*. Special reports have been submitted by this Department on all these outrages, but I do not consider it advisable to enter into any details in this report.

Explosive Rules.

24. An amendment was made during the year to Schedule A of the rules for testing of explosives. This amendment is shown in Appendix I.

Explosive Substances Act.

25. During the year under report it was found necessary by the Government of India, in consequence of the anarchist outrages, to introduce a new Act called the Explosives Substances Act, 1908 (VI of 1908). This is based on a similar Act in force in England, which was introduced for a similar reason.

Authorised Explosives.

26. A list of explosives at present authorised for importation into British India for general sale, has been published in the *Gazette of India* for information. This list is given in Appendix J.

Petroleum Rules.

27. The draft consolidated petroleum rules to be uniformly adopted in India, were issued by the Government of India in December 1908 to Local Government and Administrations for final issue.

28. In conclusion I would like to bring to the notice of the Government of India the excellent work done during the year by the Inspectors of Explosives, Captain J. S. Rush and Captain J. W. Turner. In addition to their ordinarily heavy duties of inspection work, they, specially Captain J. W. Turner, have been constantly called away in the middle of inspection tours to carry out investigations

in connection with anarchist outrages, and have had to resume their inspection tour afterwards. They have had extremely hard work and I cannot speak too highly of their services.

I have the honour to be,

SIR,

Your most obedient Servant,

C. A. MUSPRATT-WILLIAMS,
LIEUT.-COLONEL, R.A.,
Chief Inspector of Explosives in India.

APPENDIX A.

List of Magazines and Licenses granted under Rule 17 of the Explosives Rules for the year 1908.

Presidency or Province.	District.	Magazines. Under renewed license.	Magazines. Under new license	Magazines. Total.	License. Renewed.	License. New.	License. Total.
Bengal	Burdwan	22	...	22	19	...	19
	Darjeeling	3	...	3	3	...	3
	Gaya	3	...	3	3	...	3
	Hazaribagh	14	...	14	12	...	12
	Hooghly	4	...	4	1	...	1
	Howrah	...	1	1	...	1	1
	Manbhum	14	3	17	12	3	15
	24-Parganas	2	...	2	1	...	1
	Singbhum.	...	2	2	...	1	1
	Total	62	6	68	51	5	56
Ajmer-Merwara	Ajmer	...	1	1	...	1	1
	Total	...	1	1	...	1	1
Bombay	Ahmedabad	2	...	2	2	...	2
	Bombay	19	...	19	12	...	12
	Dharwar	2	...	2	1	...	1
	Karachi*	9	...	9	5	...	5
	Kolaba	...	1	1	...	1	1
	Panch Mahals	...	1	1	...	1	1
	Total	32	2	34	20	2	22
Burma	Hanthawaddy	3	...	3	2	...	2
	Mergui	1	...	1	1	...	1
	Myitkyina	...	1	1	...	1	1
	Ruby Mines	1	1	2	1	1	2
	Total	5	2	7	4	2	6
Central Provinces	Balaghat	1	...	1	1	...	1
	Bilaspur	1	...	1	1	...	1
	Chindwara	1	...	1	1	...	1
	Jubbulpur	3	...	3	2	...	2
	Nagpur	3	4	7	2	2	4
	Narsingpur	2	...	2	1	...	1
	Raipur	4	...	4	4	...	4
	Saugor	1	...	1	1	...	1
	Total	16	4	20	13	2	15
Eastern Bengal and Assam	Cachar	2	...	2	1	...	1
	Lakhimpur	1	...	1	1	...	1
	Total	3	...	3	2	...	2
Madras	Anantapur	3	...	3	2	...	2
	Chingleput	2	2	4	1	1	2
	Godaveri	2	...	2	1	...	1
	Kistna	1	...	1	1	...	1
	Madras	19	...	19	5	...	5
	Nellore	4	...	4	2	...	2
	Nilgiris	2	...	2	1	...	1
	Tanjore	2	...	2	2	...	2
	Trichinopoly	2	1	3	2	1	3
	Vizagapatam	5	...	5	3	...	3
	Total	42	3	45	20	2	22
Punjab	Rawalpindi	1	...	1	1	...	1
	Total	1	...	1	1	...	1
United Provinces	Cawnpur	1	...	1	1	...	1
	Dehra Dun	1	...	1	1	...	1
	Gharwal	1	1	2	1	1	2
	Lucknow	1	...	1	1	...	1
	Meerut	1	...	1	3	...	3
	Shahjehanpur	1	...	1	1	...	1
	Total	6	1	7	8	1	9

SUMMARY.

Ajmer-Merwara	...	1	1	...	1	1
Bengal	62	6	68	51	5	56
Bombay	32	2	34	20	2	22
Burma	5	2	7	4	2	6
Central Provinces	16	4	20	13	2	15
Eastern Bengal and Assam	3	...	3	2	...	2
Madras	42	3	45	20	2	22
Punjab	1	...	1	1	...	1
United Provinces	6	1	7	8	1	9
GRAND TOTAL	167	19	186	119	15	134

At Karachi there is in addition a Roburite Factory licensed under Rule 15.

APPENDIX B.

*List of non-dangerous petroleum installations licensed during the year 1908.

Province.	District.	No.
Ajmer-Merwara	Ajmer	4
	TOTAL	4
Baluchistan	Quetta	1
	TOTAL	1
Bengal	Balasore	3
	Bhagulpur	7
	Birbhum	2
	Burdwan	7
	Calcutta	4
	Champaran	2
	Cuttack	2
	Darbhanga	3
	Darjeeling	1
	Gaya	4
	Howrah	2
	Khulna	1
	Manbhum	1
	Midnapur	1
	Monghyr	4
	Mozufferpur	4
	Murshedabad	1
	Nadia	4
	Patna	4
	Purnea	1
	Sambalpur	3
	Saran	2
	Shahabad	3
	Sonthal Parganas	6
	24-Parganas	7
	TOTAL	79
Bombay	Ahmedabad	6
	Ahmednagar	3
	Belgaum	6
	Bijapur	6
	Bombay	3
	Broach	4
	Dharwar	11
	Hyderabad	1
	Karachi	6
Bombay—*contd.*	East Khandesh	3
	West Khandesh	7
	Nasik	5
	Poona	3
	Satara	3
	Sholapur	4
	Surat	7
	Thana	4
	TOTAL	82
Burma	Akyab	1
	Hanthawaddy	4
	Magwe	7
	Mingyin	1
	Pokoku	3
	Thayetmyo	1
	TOTAL	17
Central Provinces	Akola	6
	Amroati	7
	Bhandara	3
	Bilaspur	1
	Buldana	8
	Chanda	2
	Damoh	2
	Hoshangabad	4
	Jubbulpur	6
	Nagpur	4
	Narsingpur	3
	Nimar	5
	Raipur	1
	Saugor	3
	Seoni	2
	Wardha	9
	TOTAL	66
Eastern Bengal and Assam	Backergunj	1
	Bogra	1
	Chittagong	2
	Dacca	4
	Dinajpur	3
	Jalpaiguri	1

*This list includes some godowns for the storage of non-dangerous petroleum regarding which this department has cognizance.

Province.	District.	No.
Eastern Bengal and Assam —*contd.*	Lakhmipur	1
	Mymensingh	1
	Pabna	2
	Rajshahye	2
	Rungpur	2
	Sylhet	1
	TOTAL	21
Madras	Anantapur	2
	Bellary	5
	Chingleput	3
	Coimbatore	6
	Cuddapah	2
	Ganjam	4
	Godavery	4
	Guntur	4
	Kistna	5
	Kurnool	2
	Madras	8
	Madura	6
	Malabar	12
	Nellore	4
	North Arcot	2
	Salem	3
	South Arcot	7
	Tanjore	8
	Tinnevelly	6
	Trichinopoly	2
	Vizagapatam	2
	TOTAL	97
N.-W. Frontier Province	Peshawar	3
	TOTAL	3
Punjab	Amritsar	3
	Delhi	3
Punjab—*contd.*	Jullunder	1
	Lahore	3
	Ludhiana	3
	Multan	1
	Rawal Pindi	3
	Sialkot	3
	Umballa	6
	TOTAL	26
United Provinces	Agra	4
	Alligarh	1
	Allahabad	3
	Azamgarh	1
	Bahraich	1
	Bara Banki	1
	Bareilly	2
	Basti	2
	Ballia	1
	Benares	2
	Cawnpur	3
	Etawah	1
	Fyzabad	2
	Ghazipur	1
	Gonda	2
	Gorakpur	2
	Jaunpur	1
	Jhansi	3
	Lucknow	2
	Meerut	4
	Moradabad	3
	Muttra	1
	Shaharanpur	3
	Shahjehanpur	2
	TOTAL	48

SUMMARY.

AJMER-MERWARA	4
BALUCHISTAN	1
BENGAL	79
BOMBAY	82
BURMA	17
CENTRAL PROVINCES	66
EASTERN BENGAL AND ASSAM	21
MADRAS	97
NORTH-WEST FRONTIER PROVINCE	3
PUNJAB	26
UNITED PROVINCES	48
TOTAL	444

APPENDIX C.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1908 to 31st December 1908.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			Explosives.			
1	10th Jan. 1908 .	Gunpowder .	Salem . .	The District Magistrate reported that a native had filled an iron tube with gunpowder, when the charge suddenly exploded injuring the man and another who was standing close by.	...	2
2	10th Feb. 1908 .	Do. .	Arkonam . .	The District Magistrate reported that an iron cylinder loaded with gunpowder was left in the verandah of a house and it is presumed that a spark of fire must have reached it which caused an explosion, bursting the cylinder. Cylinders similar to this are used for firework displays and the cylinder in question had been fired twice, but as children in the vicinity were frightened it was put away without the powder being removed.	3	2
3	15th Feb. 1908 .	Do. .	Salem . .	The District Magistrate reported that some coolies had made two borings for blasting, and two of them thinking that both charges had exploded began to clear away the debris when one of the charges which did not explode at the time suddenly exploded, injuring the men severely.	...	2
4	29th Feb. 1908 .	Do. .	Do. .	The District Magistrate reported that in deepening a well a native was ramming a charge of gunpowder with a crowbar when the charge exploded injuring him severely.	...	1
5	16th March 1908	Do. .	South Arcot .	The Magistrate reported that a native wanted to test some gunpowder he had in a bag, and to do so took out a little powder from the bag and applied fire to it. Some sparks fell on the bag of powder which caused an explosion fatally injuring the man.	1	...
6	22nd March 1908.	Do. .	Salem . .	The District Magistrate reported that as a bomb called "out" consisting of saltpetre, sulphur and charcoal and a powder which produces red and white light did not explode, a native ignited the contents when the mixture suddenly exploded injuring three persons one of whom succumbed to his injuries.	1	2
7	16th April 1908	Do. .	Do. . .	The District Magistrate reported that during a festival a native was engaged in firing Adirvadis (salutes from an iron tube filled with gunpowder and attached to a log of wood in the ground) and during the course of firing he held the earthen vessel containing the powder and also the lighted fuze in one hand, when a spark from the fuze ignited the powder and an explosion resulted in consequence, injuring him severely.	...	1
8	1st May 1908. .	Do. .	Elephanta .	The District Magistrate reported that during blasting operations a native put down a torch on the ground without warning anybody and a native lad who had bought 3 or 4 lbs. of powder in a bag unknowingly placed the bag on the smoulding torch when an explosion occurred, injuring the boy severely.	...	1

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of Persons	
					Killed.	Injured.
				Explosives—*continued.*		
9	6th May 1908.	Gunpowder	Mymensingh	The Magistrate reported that a marriage procession of about 100 people being overtaken by a storm took shelter in a school house in a room in which gunpowder for fireworks, etc., was stored. One of the party lit a torch and a spark from the torch having accidentally fallen into a basket of gunpowder caused an explosion seriously injuring about 60 persons of whom 17 died.	17	43
10	18th June 1908.	Do.	Santhapuram	The Magistrate reported that two natives were manufacturing gunpowder and one of them was smoking. A spark from the cigar fell on the powder which exploded and injured both the men.	...	2
11	13th July 1908	Do.	Paparapatti, Salem	The Magistrate reported that while a native was firing a small quantity of blasting powder for blasting a well, he was severely injured and died from the effects.	1	...
12	25th July 1908	Do.	Thotavalasai, Salem.	The Magistrate reported that while two men were blasting a well one man was injured by the explosion.	...	1
13	12th Aug. 1908	Do.	Balagoundampudur, Salem,	The Magistrate reported that while "Adirivadis" loaded with gunpowder were being fired, a spark fell on some gunpowder kept at a distance in a basket and exploded it injuring two lads.	...	2
14	15th Aug. 1908	Do.	Kulasekarapatnam, Tinnevelly	The Magistrate reported that while some gunpowder was being pounded, it suddenly exploded injuring two men, one of whom died subsequently. The explosion was due apparently to some grit.	1	1
15	1st Dec. 1908.	Do.	Runch, Damoh	The District Magistrate reported that a native was grinding powder on a grinding stone, when an explosion occurred, fatally injuring him.	1	...
16	20th Oct. 1908.	Do.	Salem	The Magistrate reported that a native during blasting operations placed a charge of powder and clay in a hole and rammed the charge with an iron rod. The powder exploded severely injuring him.	...	1
17	12th Nov. 1908.	Do.	Ditto.	The Magistrate reported that while a native was examining some gunpowder with the help of a naked light, the powder exploded and caused injuries to the man, who subsequently died.	1	...
18	19th Nov. 1908.	Do.	Rasipur, Salem	The District Magistrate reported that blasting was being carried out in a well and while the charge of the previous days were being examined, an unexploded charge exploded and injured two persons.	...	2
19	27th Nov. 1908	Do.	Salem	The District Magistrate reported that while a well was being blasted, an explosion occurred, fatally injuring one man and seriously injuring another.	1	1
				Total	27	64
20	25th Feb. 1908	Dynamite	Elephanta	During blasting operations a misfire was not noticed and, when a man struck the ground with his hammer, the charge exploded.	...	1

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			Explosives—*continued.*			
21	13th June 1908 .	Dynamite .	Madras .	The Commissioner of Police reported that a shackle atached to the head of a crane dropped on the groyne of the Madras Harbour and caused an explosion. It was found that in breaking a dynamite cartridge on the groyne, a piece must have remained and the iron shackle falling on it caused the explosion.	...	2
22	20th Oct. 1908 .	Gelignite .	Bombay .	The Commissioner of Police reported that a native was accidentally killed by a stone from a blast striking him. The deceased was about 400 yards away from where the blasting operations were being carried on and the stone which hit him weighed about 2 lbs.	1	...
23	November 1908 .	Dynamite and detonator.	Moulmein .	The Deputy Commissioner reported that a quarry Engineer had 4 cartridges in his left hand tied together and he was making the charge ready. He made a small hole with a piece of wood in one of the cartridges to put the detonator into and inserted it. Thinking the detonator was not far enough in he pushed it further and the cartridges exploded.	...	1
				TOTAL .	1	4
24	16th Nov. 1908 .	Detonators .	Kalagauk, Amherst.	The Deputy Commissioner reported that a European went out in a Sampan to kill fish. With a match he lit a fuse which had been inserted in a detonator, and the charge exploded in his hand before he threw it in the water with the result that his left hand was torn off, his right eye destroyed and he was severely wounded on the chest and face. The man was believed to be under the influence of liquor at the time.	...	1
				TOTAL .	...	1
25	31st Jan. 1908 .	Fireworks consisting of chlorate of potash and sulphate of yellow arsenic.	Calcutta . .	The Inspector of Police reported that a native lad filled an iron pipe with the mixture and lighted it with a match when it exploded causing hurt to another lad who was standing near by.	...	1
26	8th March 1908	Fireworks consisting of sulphur; saltpetre and ithil (small shells).	Palghat . .	The District Magistrate reported that while the ingredients were being pounded with a wooden pestle in a wooden mortar, an explosion occurred, fatally injuring four people and seriously injuring three others.	4	3
27	2nd April 1908 .	Fireworks .	Rampur, Mymensingh.	The Magistrate reported an accident from a firework called "Bombsetar" which consists of a stout frame work of wood often covered with sheets of iron and stuffed with rags, gunpowder and sulphur, charcoal and saltpetre. In the present case the bomb had no covering of iron and when it was ignited by means of fire being put into it, it exploded and burst killing two men.	2	...
28	27th May 1908 .	Firework consisting of chlorate of potash and sulphide of arsenic.	Calcutta . .	It appears a native was in the act of preparing a bomb firework and that some violence having been applied to the bomb, it exploded. The man had his left hand practically blown away and received injuries about his body. His son who was near by was slightly injured (Newspaper)	...	2
29	10th June 1908 .	Fireworks .	Do. . .	A native was assisting at a wedding ceremony by letting of fireworks and, in igniting a sky rocket, it exploded, badly injuring his hands.	...	1

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
				Explosives—*continued.*		
30	15th June 1908 .	Fireworks consisting of chlorate of potash, phosphorus, sulphide of arsenic and sulphur.	Supaul, Bhagalpur.	The Magistrate reported that while a license-holder was manufacturing firework bombs, a bomb exploded and destroyed the house and a part of the bazar.	1	2
31	22nd June 1908.	Fireworks composition, chlorate of potash and momchal (sulphate of antimony).	Banpur . .	The police reported that a native was giving an exhibition of a parrot firing a toy cannon and for the purpose of loading the cannon, he was taking out chlorate of potash and sulphate of antimony, the ingredients used for the purpose from a tin box. The lid of the box was fixed lightly to the box and as he applied some force to open it, the contents exploded severely injuring him.	...	1
32	23rd June 1908 .	Fireworks consisting of chlorate of potash, red arsenic and small stones.	Bombay . .	The Commissioner of Police reported that a number of these fireworks were manufactured and placed in tin boxes and whilst lifting one of these a native accidently let it drop causing an explosion.	2	...
33	August 1908 .	Fireworks .	Jullundur . .	The Deputy Commissioner reported that a native woman was making throw down crackers when the potash used in their manufacture exploded and she with another woman and 4 children were so severely burnt that the two women and three of the children died from the effects.	5	1
34	6th Sept. 1908 .	Do. .	Calcutta . .	A native was preparing firework bombs consisting of chlorate of potash and sulphide of arsenic when an explosion occurred fortunately without any damage. The man was prosecuted for manufacturing fireworks without a license and fined. (Newspaper).	...	...
35	Sept. 1908 .	Fireworks consisting of chlorate of potash and other ingredients.	Diglur, Aurungabad.	The Inspector General of Police reported that an explosion occurred through carelessness on the part of a native who was making fireworks.	4	1
36	8th Oct. 1908 .	Fireworks consisting of red arsenic and chlorate of potash.	Bombay . .	The Commissioner of Police reported that a native, while making these fireworks, accidently dropped one of them into a mixture of arsenic and potash causing an explosion which fatally injured his wife and seriously injured him.	1	1
37	13th Oct. 1908 .	Fireworks consisting of chlorate of potash and red arsenic.	Do. . .	The Commissioner of Police reported that a native was making fireworks and had prepared a small heap of them, which were lying before him in the centre of the room. In the act of tying one of them, it exploded causing the heap in front to explode and inflicting fatal injuries on him and severe injuries on his son.	1	1
38	20th Oct. 1908	Fireworks consisting of chlorate of potash and realgar.	Erambur, South Arcot.	The Magistrate reported that native lads were grinding chlorate of potash and realgar (sulphide of arsenic) together, when there was an explosion seriously injuring one and slightly injuring the other.	...	2
39	25th Oct. 1908 .	Fireworks consisting of chlorate of potash and sulphide of arsenic.	Bombay . .	The Commissioner of Police reported that while a native was rubbing between the palm of his hands a number of throw down crackers, they suddenly exploded burning him severely.	...	1
40	25th Oct. 1908 .	Fireworks .	Howrah . .	The Magistrate reported that a native lad was playing with a lighted firework. It fell in a firework shop where an open tin of powder and some fireworks were kept for sale. The powder and fireworks caught fire and exploded.	4	2

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons Killed.	Number of persons Injured.
				Explosives—*concluded.*		
41	28th Nov. 1908 .	Fireworks. Throw downs of sulphide of arsenic and chlorate of potash.	Bombay . .	The Commissioner of Police reported that as a sowar was riding on a foot path his horse's feet struck on some of these fireworks which had been buried, with the result that an explosion occurred burning the horse's legs. It appears a police servant had been directed to place some of these fireworks in a kerosine tin of water but mistaking the order he buried them, but not deep enough.	...	...
42	29th Oct. 1908	Fireworks, Rocket	Calcutta . .	The Commissioner of Police reported that a fire broke out in a firework shop due to a native lad having thrown a lighted rocket inside.	...	...
43	30th Oct. 1908	Fireworks consisting of bisulphate of arsenic and nitre.	Salem . .	The Magistrate reported that a native lad had a number of fireworks secured in his waist cloth and in falling down some steps, the fireworks exploded injuring him so severely that he died from the effects.	1	...
44	31st Oct. 1908	Fireworks consisting of red arsenic and chlorate of potash.	Bombay . .	The Commissioner of Police reported that a native dropped a bowl containing fireworks causing them to explode. No damage was done to property or person.	...	...
45	8th Dec. 1908 .	Firework composition, chlorate of potash and sulphide of arsenic.	Salem . .	The Deputy Magistrate reported that a native lad was attempting to open a box containing chlorate of potash and sulphide of arsenic for making crackers. The mixture exploded causing injuries to the lad.	...	1
46	27th Dec. 1908 .	Fireworks .	Sundip, Noakhali	A Sarang of a barge lying at Sundip Ghat got on board a steamer lying near by and tried to set fire to a firework, but as the wick of the firework was somewhat damp he began to blow on it when the firework exploded fatally injuring him and slightly injuring three others.	1	3
				TOTAL .	26	23
				Petroleum.		
47	12th Feb. 1908 .	Kerosine .	Bombay . .	The Commissioner of Police reported that a native woman was lying on her bed when a wall-lamp fell on her, setting fire to her clothes and burning her so seriously that she died from the effects.	1	...
48	4th March 1908	Crude oil . .	Twingon . .	The Sub-Divisional Officer reported that a fireman having inspected the gauge on a boiler with a lighted torch approached an oil well with the torch in his hand and getting too close to the tanks near the well ignited the gas round the tanks and so started a fire.	...	...
49	12th March 1908	Petrol . .	Calcutta . .	At about 7 o'clock at night a cleaner attempted to refill the tank on a motor car with petrol in close proximity to a motor lamp, when the liquid ignited, destroying the body and other parts of the car.	...	...
50	12th March 1908	Do . .	Do. . .	A native cleaner on his own initiative, refilled a tank on a motor car with petrol in close proximity to a lighted motor lamp, with the result that the spirit ignited. The body of the car and canopy were destroyed, the steering wheel reduced to charcoal and the two front tyres melted by the heat of the flames.	...	...
51	28th March 1908	Kerosine . .	Do. . .	The Inspector of Police reported that as a native lit a kerosine dibia or lamp, it suddenly exploded setting fire to his clothes, and a woman who attempted to extinguish the fire on the man's clothes was also burnt.	...	2

No.	Date of accident.	Nature of Oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			Petroleum—*continued.*			
52	29th March 1908	Kerosine . .	Jhansi . .	A gunner of the Royal Artillery in attempting to extinguish a kerosine oil lamp by blowing down the chimney, caused the oil to catch fire, and the lamp exploded, injuring him fatally (Newspaper).	1	...
53	2nd April 1908	Do. . .	Bombay . .	The Commissioner of Police reported that while a native was cooking food over an oil stove it flared up and set his clothes on fire, and burned him so severely that he died from the effects.	1	...
54	5th April 1908	Do. . .	Do. . .	The Commissioner of Police reported that a native child while playing knocked a small kerosine oil lamp over himself and set fire to his clothes. He was burnt so severely that he died from the effects of the injuries received.	1	...
55	13th April 1908 .	Do. . .	Trichinopoly .	The District Magistrate reported that a fire occurred in a depôt for the storage of kerosine in tins and cases and that the fire was more or less due to careless soldering. 130 odd cases of oil were destroyed.	...	...
56	16th April 1908 .	Do. . .	Serampur . .	The District Magistrate reported that a kerosine lamp accidentally fell into a tin of kerosine oil which exploded injuring four boys, three of whom died.	3	1
57	17th April 1908 .	Do. . .	Salem . .	The District Magistrate reported that a lighted kerosine lamp fell on a native lad and burnt him so severely that he died from the effects.	1	...
58	21st April 1908 .	Petrol . .	Narculdanga .	The police reported that at about 8-30 p.m. while the petrol vats in the premises of the Indian Oil Products, Limited, were being cleared of oil, petrol vapour which was issuing must have come in contact with an oil lamp placed outside the roof of the building. The fire instantly spread over the whole building which is principally of iron work.	...	...
59	22nd April 1908 .	Kerosine . .	Calicut . .	The District Magistrate reported that while a lighter was being loaded with cases of kerosine oil from a steamer, it suddenly took fire. The actual cause of the fire could not be ascertained. It may have been due to the men of the boat keeping a small fire going at the bottom of the boat to warm their food.	...	...
60	23rd April 1908.	Do. . .	Bombay . .	The Commissioner of Police reported that a native girl while carrying a lighted kerosine lamp accidentally dropped it and some of the oil falling on her clothes caught fire. She was so severely burnt that she died from the injuries.	1	...
61	28th April 1908 .	Do. . .	Ferozepur. .	The Deputy Commissioner reported that a native was making a fire for his hooka with a piece of rope. When the rope took fire a lighted piece of it fell from his hand into a canister of oil which was near by, ignited the oil which set his clothes on fire and injured him so severely that he died from the effects.	1	...
62	April 1908 .	Do. . .	Kandawgalay, Burma.	A lighted kerosine oil lamp left on the floor of a house was knocked over by a little child, who received severe burns and died from the effects.	1	...
63	21st May 1908 .	Do. . .	Bangalore .	A large hanging lamp, hanging from the roof over the stage of the Bowring Institute, suddenly fell on the stage, causing an explosion and the bursting of the reservoir. (Newspaper).	...	...

No.	Date of accident.	Nature of Oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			Petroleum—*continued.*			
64	21st May 1908	Kerosine	Karachi	73 out of 75 huts in a serai camp in the Translyari quarter were destroyed by fire owing to a woman using kerosine oil to light a fire to cook food. (Newspaper).	...	...
65	May	Do.	Haripal	The District Magistrate reported that a lighted kerosine lantern was found to be full of oil and a native in attempting to pour some oil from the lantern into a canister accidentally let the lamp fall into the canister of oil which caught fire and caused fatal injuries to two persons.	2	...
66	May 1908	Do.	Bankipur	A fire broke out in a house of a native resulting in the death of five persons due to a tin of kerosine catching fire at the time it was being opened. (Newspaper).	5	...
67	5th June 1908	Do.	Bombay	The Commissioner of Police reported that a native woman died from the effects of burns all over her body due to a kerosine oil lamp having been upset over her.	1	...
68	12th June 1908	Petrol	Bombay Harbour	A barge laden with 3,600 drums of petrol left the S.S. *Singu* at 4-30 P.M. on the 11th under police supervision and as it left too late to reach its destination and discharge before sunset, it proceeded up the harbour and anchored off Jackeria Bunder. Before the boat left the steamer all the crew were searched. At 3 A.M. on the 12th the constable and crew who were on board were awakened by an explosion and jumped overboard, and found that the Tindal was missing. His remains were found later on the barge, the Police Constable and all the crew were burnt and injured. Two of the crew died from their injuries. It is presumed that the explosion was due to the Tindal lighting a match.	3	...
69	13th June 1908	Kerosine	Calcutta	A native girl accidently dropped a kerosine lamp which set fire to her clothes, she was so severely burnt that she died from the injuries. (Newspaper.)	1	...
70	19th June 1908	Petrol	Syriam	Flames from the after part of a cargo boat, laden with 2,517 drums of petrol were noticed by a durwan who was on board at the time and in a short while the whole boat was enveloped in flames and every now and then an explosion was heard and burning petrol drums were shot into the air. The fire probably originated by one of the men having gone down below to cook food.	...	...
71	19th June 1908 and 20th June 1908.	Earth oil	Wetmasut, Yenangyang.	Earth oil was leaking from a key hole or gate of the pipe line of the Burma Oil Company, and it is believed that a native must have lit a match or placed a light near by to find out the point of leakage. A similar fire occurred on the day after (20th June) at the same place.	...	...
72	June 1908	Kerosine	Calcutta	A native woman upset a lighted kerosine lamp and was so severely burnt that she died from the injuries. (Newspaper.)	1	...
73	15th Aug. 1908	Earth oil	Magwe	The Deputy Commissioner reported that a native took a lighted lamp under some oil that was being poured out from one tin to another. The oil suddenly ignited and the tins of oil exploded burning two men, one of whom died from the injuries.	1	1

No.	Date of accident.	Nature of Oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
				Petroleum—*continued.*		
74	5th Sept. 1908 .	Petrol . .	Bombay . .	The Commissioner of Police reported that a native was found dead against the bulwarks of No. 4 pocket of the S. S. *Beme* lying in the harbour. In the pocket there must have been an accumulation of petrol gas and the cause of the man's death was no doubt due to the gas overcoming him.	1	...
75	6th Sept. 1908 .	Do. . .	Do. . .	The Commissioner of Police reported that about 9 P.M. a car had been placed in the garage and its driver was ordered to take petrol to a car stranded in Hornby Road for want of spirit, and to bring it back and place it in the garage. On his return he found the car previously brought in in a blaze as well as another one in front of it. The woodwork of the building also caught fire, but it was soon extinguished. No cause could be assigned for the outbreak, but it appeared that, when the first car was brought in, the lamps were burning, and it was the duty of the watchman to put them out. He was in possession of a lantern with which he went his rounds. When putting out the lamps he may have placed the lantern near the carburetor igniting the gas that may have been about.	...	...
76	21st Oct. 1908 .	Kerosine .	Do. .	A Mahomedan while fanning his food, accidently knocked over a lighted kerosine oil lamp which set fire to his clothes. He was so severely burnt that he died from the effects.	1	...
77	22nd Oct. 1908 .	Do. .	Do. .	The Commissioner of Police reported that a leakage of oil from the pipe line, connecting the pumping station at Stone Bunder with the bulk oil installations, percolated through the soil, and found its way into the Bunder Basin through a small underground drain and collected in pools. At 8 P.M. a fire occurred in the Bunder, and it is surmised that careless biddie smoking caused the fire.	...	...
78	25th Oct. 1908 .	Do. .	Do. .	The Commissioner of Police reported that owing to leakage of kerosine from a pipe line belonging to the Bombay Port Trust, a fire occurred at Tank Bunder. The oil found its way to timber ponds, through a covered drain and collected in pools near the opening of the drain and also floated on the water. A coolie, whilst collecting the oil, lit a biddie and apparently threw the lighted match into the oil which at once ignited severely burning him about the body.	...	1
79	2nd Nov. 1908 .	Do. .	Do. .	The Commissioner of Police reported that a native woman was sitting in her room beneath a lamp on the wall. In getting up she accidently knocked against the lamp, causing it to fall. It set fire to her clothes and burnt her so severely that she died from the effects.	1	...
80	16th Nov. 1908 .	Do. . .	Do. . .	The Commissioner of Police reported that a native lad was warming himself in front of a grass fire, when a native poured some kerosine oil on the fire in front of where the lad was seated, with the result that the flames set his clothes on fire and burnt him so severely that he died from the effects.	1	...
81	18th Nov. 1908 .	Do. . .	Do. . .	The Commissioner of Police reported that a native child was playing near a naked kerosine oil lamp, when his clothes accidently caught fire and his right arm was burnt.	...	1

No.	Date of accident.	Nature of Oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			Petroleum—*concluded.*			
82	19th Nov. 1908 .	Kerosine . .	Bangalore .	A demented Eurasian woman locked herself up in a room, and after saturating her clothes with kerosine oil set fire to them and was burnt to death before her neighbours could break open the door to save her. (Newspaper.)	1	...
83	21st Nov. 1908 .	Do. . .	Bombay . .	The Commissioner of Police reported that a native lad received fatal injuries from burns by a kerosine lamp upsetting over him.	1	...
84	1st Dec. 1908 .	Liquid fuel .	Twingon . .	The Government of Burma reported that a small liquid fuel tank of the Nathsingh Oil Co. caught fire due to the carelessness of a coolie who allowed a lighted faggot to come in contact with the valve of the pipe which conveys oil from the fuel tank to the furnace. A few drops of oil were escaping from the valve.	...	...
85	19th Dec. 1908 .	Do. .	Paunggodaw, Burma.	The Township Officer, Yenangyang, reported that two men had cleaned the boiler at the Nathsingh Oil Co.'s water pumping station, and afterwards one of them picked up an iron rod wrapped with a rag at one end from near a pot of oil which was burning. The rag was apparently smoulding and he dipped it into the fuel tank intending to make a fire in the furnace of the boiler, when the oil in the tank immediately ignited.	...	...
86	21st Dec. 1908 .	Petroleum .	Digboi . .	The General Manager, Assam Oil Co., reported that about 4 P.M. a sudden explosion occurred followed by all the oil round the Derrick at the well catching fire together with that which had and was still flowing into a tank alongside the well. It is presumed that a spark from the chimney of a boiler 164 feet away from the well ignited the gas from the oil. This accident was made the subject of a special report to the Local Government by the Chief Inspector of Explosives.	6	...
87	31st Dec. 1908 .	Petrol . .	Bombay . .	The Commissioner of Police reported that a fire broke out in a petrol store about 7 P.M. A servant was sent to fetch some petrol and he went there with a light which apparently caused the fire, as shortly after flames and smoke was noticed issuing from the store.	...	...
				TOTAL .	37	6
			Chemicals.			
88	3rd June 1908 .	Spirits of wine .	Bombay . .	The Commissioner of Police reported that a native in attempting to light a spirit stove to heat water, turned the wick up too high with the result that when the match was applied a flame burst out and burnt the man. A second man attempted to extinguish the stove, but not understanding the mechanism accidently released the tap and this also caught fire and burnt this man as well.	...	2
89	4th June 1908 .	Carbolic acid .	Calcutta . .	A Hindu lad was admitted into the Medical College Hospital suffering from severe burns all over his body, caused by carbolic acid thrown upon him by another boy who is said to have had a grudge against him. (Newspaper.)	...	1
90	10th June 1908 .	Nitric acid .	Do. . .	A jemadar was asleep in a part of a stable company's premises where some phials were hanging from nails in the wall. One of these which contained nitric acid, got dislodged and fell on his body causing severe burns. (Newspaper.)	...	1

No.	Date of accident.	Nature of chemical.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			Chemicals—*continued.*			
91	June 1908 .	Nitric acid .	Beliaghata .	A native in his desire to wreak his vengence on a rival threw some nitric acid on him causing severe burns. He was sentenced to two years rigorous imprisonment. (Newspaper.)	...	1
92	15th Oct. 1908 .	Acids . .	Madras . .	The Agent, South Indian Railway Company, reported that after a train started from Egmore Station, smoke was seen rising from the doorway of one of the compartments of a powder van, and on examination it was found to be due to sulphuric acid which leaked out due to a defective stopper.	...	...
93	6th Nov. 1908 .	Nitric acid .	Calcutta . .	The Commissioner of Police reported that while a native was carrying a box containing bottles of nitric acid on his head, one of the bottles either broke or the cork came out and the acid leaked through causing injuries.	...	1
				TOTAL .	...	6
			Miscellaneous.			
94	27th Mar. 1908 .	Gas . .	Calcutta . .	The Commissioner of Police reported that while a European Engineer was attending to something on the top of a cylinder of gas erected midship of the lightship *Planet* an explosion occurred resulting in the blowing up of the ship. The wreck sank immediately, and the Engineer and khalasi, who were the only two on board, were killed.	2	...
95	5th Aug. 1908 .	Do. . .	Bombay . .	The Commissioner of Police reported that a fire occurred at a printing press. The building was lighted by a gas system in which copper cylinders are used and during the fire one of these containing oil and compressed gas, exploded under the intense heat with the result that a portion of the blazing roof was lifted into the air.	...	1
96	28th Aug. 1908 .	Ships, lights and signals, cartridges, fire hose, etc.	Between Busrah and Karachi .	At about 1-25 P.M. a servant on board the S.S. *Kasara* noticed some smoke coming out of the Chief Officer's store-room. He called another servant and brought water to put out the fire. On opening the door an explosion took place wrecking the room and injuring seven persons. The cause of the explosion was presumed to have been due to carbide of calcium contained in Holme's lights coming in contact with water.	...	7
97	21st Sept. 1908 .	Matches, etc. .	Kumbakonam .	The Agent, South Indian Railway Company, reported that while seven cases supposed to contain matches were being unloaded, one of them burst with a loud report and catching fire was completely destroyed, on six cases being opened they were found to contain percussion caps, magic wire, star matches and non-safety Congreve matches.	...	...
98	15th Oct. 1908 .	Coloured matches.	Coimbatore .	The Agent, South Indian Railway Company, reported that while a case of coloured matches was being unloaded from a railway wagon it caught fire through spontaneous combustion and was completely destroyed.	...	...
				TOTAL .	2	8

Summary of accidents during the year 1908.

Explosives or dangerous and inflammable substances.	Accidents causing loss of life and bodily injury.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons			
		Killed.	Injured.		
EXPLOSIVES.					
Gunpowder	19	27	64	...	19
Nitro-compounds	4	1	4	...	4
Ammunition	1	...	1	...	1
Fireworks	18	26	23	4	22
TOTAL .	42	54	92	4	46
PETROLEUM.					
Petroleum generally . .	25	37	6	16	41
TOTAL .	25	37	6	16	41
CHEMICALS . .	5	...	6	1	6
TOTAL .	5	...	6	1	6
MISCELLANEOUS . .	3	2	8	2	5
TOTAL .	3	2	8	2	5
GRAND TOTAL .	75	93	112	23	98

APPENDIX D.

Detailed statement showing the number of accidents and persons killed and injured during the five years 1904 to 1908.

Year.	Gunpowder.			Dynamite and other nitro compound blasting explosives.			Ammunition.			Fireworks.		
	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured
1904 . .	11	25	30	5	3	10	1	...	1	13	10	9
1905 . .	7	6	3	10	6	19	...	...	...	15	13	26
1906 . .	13	21	28	2	1	2	...	...	...	11	4	14
1907 . .	11	18	20	4	...	6	3	...	4	19	12	20
1908 . .	19	27	64	4	1	4	1	...	1	22	26	23
Total .	61	97	145	25	11	41	5	...	6	80	65	92
Average .	12	19	29	5	2	8	1	...	1	16	13	18

Year.	Petroleum.			Chemicals.			Miscellaneous.		
	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.
1904 . .	8	42	10	4	...	9	5	...	1
1905 . .	12	7	13	...	...	...	...	...	...
1906 . .	10	9	3	...	...	...	3	1	1
1907 . .	15	9	8	...	...	...	6	7	2
1908 . .	41	37	6	6	...	6	5	2	8
Total .	86	104	40	10	...	15	19	10	12
Average .	17	21	8	2	...	3	4	2	2

APPENDIX E.

Comparative statement showing the number of accidents and persons killed and injured during the five years 1904 to 1908.

Year.	Accidents causing loss of life or bodily injury.			Accident not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons.			
		Killed.	Injured.		
1904	40	80	70	7	47
1905	40	32	61	4	44
1906	34	36	48	5	39
1907	50	46	60	8	58
1908	75	93	112	23	98
Total	239	287	351	47	286
Average	48	57	70	9	57

APPENDIX F.

Statement showing the imports of explosives by sea into British India from other countries in the year 1908.

	Imports in 1908.						
	Bengal.	Bombay.	Sind.	Madras.	Burma.	Eastern Bengal and Assam.	Total.
Quantity.							
Gunpowder, black . . . . lbs.	97,756	124,607	1,000	27,640	5,750	...	256,753
Gunpowder, smokeless . . . „	1,975	3,400	29,835	1,555	850	...	37,615
Ammonal . . . . . „	...	...	...	...	250	...	250
Dynamite . . . . . „	190,064	50,000	14,470	76,000	19,940	...	350,474
Blasting Gelatine . . . . „	9,856	...	...	697,000	19,940	...	726,796
Gelignite or Gelatine Dynamite . „	9,968	60,000	...	93,000	2,240	...	165,208
Monobel Powder . . . . „	...	...	...	...	...	...	...
Other nitro-compound explosives . „	77,616	...	...	...	...	...	77,616
Detonators . . . . . No.	...	180,000	50,000	2,725,000	107,000	...	3,062,000
Fireworks . . . . . lbs.	...	1,381,108	18,287	36,602	68,899	...	1,504,896
Total . lbs.	387,235	1,619,115	63,592	931,797	117,869	...	3,119,008
Total No.	...	180,000	50,000	2,725,000	107,000	...	3,062,000
Value in Rupees.							
Gunpowder, black	83,724	64,237	375	12,703	6,836	...	1,67,875
Gunpowder, smokeless . . .	6,019	12,240	44,919	3,950	2,693	...	69,821
Ammonal	...	...	...	...	113	...	113
Dynamite	1,52,981	39,753	5,493	65,220	16,569	...	2,80,016
Blasting Gelatine	10,367	...	...	6,57,782	21,121	...	6,89,270
Gelignite or Gelatine Dynamite .	8,104	47,697	...	73,634	2,581	...	1,32,016
Monobel Powder	...	...	...	..	...	...	...
Other nitro-compound explosives .	47,965	...	..	...	...	...	47,965
Detonators	8,324	3,442	1,521	64,397	1,472	...	79,156
Fireworks	27,021	2,71,977	15,969	21,418	22,040	...	3,58,425
Total . Rs.	3,44,505	4,39,346	68,277	8,99,104	73,425	...	18,24,657

APPENDIX G.

Comparative statement showing the import of explosives by sea into British India from other countries during the five years 1904 to 1908.

	1904.	1905.	1906.	1907.	1908.
Gunpowder, black . . . . . lbs.	473,925	202,751	168,353	170,299	256,753
Gunpowder, smokeless . . . . . „	48,246	45,125½	39,745	29,317	37,615
Ammonal . . . . . „	...	...	...	...	250
Dynamite . . . . . „	149,968	249,968	352,207	262,495	350,474
Blasting Gelatine . . . . . „	895,040	558,200	906,400	1,085,050	726,796
Gelignite or Gelatine Dynamite . . . . „	55,048	123,048	132,594	175,040	165,208
Monobel Powder . . . . . „	...	...	2,000	...	...
Other nitro-compound explosives . . . „	130,811	109,475	72,921	89,256	77,616
Detonators . . . . . No.	3,020,000	1,797,000	5,536,000	3,052,400	3,062,000
Fireworks . . . . . lbs.	2,264,162	1,661,229	2,410,388	2,446,428	1,504,896
TOTAL . lbs.	4,017,200	2,949,796½	4,084,608	4,257,885	3,119,608
TOTAL . No.	3,020,000	1,797,000	5,536,000	3,052,400	3,062,000

APPENDIX H.

Statement showing the quantity of petroleum imported by sea into British India during the years 1905 to 1908.

Non-dangerous petroleum.

	1905.	1906.	1907.	1908.
	Gallons.	Gallons.	Gallons.	Gallons.
Chittagong	3,970,269	1,822,051	5,547,944	6,308,806
Balasore	10,000	26,200	...	...
Chandbali	367,500	405,000	270,200	206,150
Calcutta	27,144,014	20,342,078	27,342,923	33,379,196
Bombay	22,099,928	17,402,913	22,439,071	24,750,034
Sind	5,157,947	5,007,932	7,171,933	10,448,574
Madras	9,765,384	6,956,459	8,942,869	13,018,601
Burma	1,595,209	1,156,179	1,828,973	2,514,834
TOTAL	70,110,251	53,118,812	73,543,913	90,626,195

Dangerous petroleum.

	1905.	1906.	1907.	1908.
	Gallons.	Gallons.	Gallons.	Gallons.
Chittagong	...	...	...	...
Balasore	...	...	...	...
Chandbali	...	...	...	...
Calcutta	14,500	...	12,270	20,048
Bombay	66,017	184,243	92,258	110,390
Sind	622	9,795	2,733	25,801
Madras	7,828	88,104	25,400	53,756
Burma	...	...	...	...
TOTAL	88,972	232,142	132,661	209,995

Statement showing the quantity of petroleum produced in Assam and Burma during the years 1905 to 1908.

	Non-dangerous petroleum.				Dangerous petroleum.				
	1905.	1906.	1907.	1908.		1905.	1906.	1907.	1908.
	Gallons.	Gallons.	Gallons.	Gallons.		Gallons.	Gallons.	Gallons.	Gallons.
Assam	1,543,212	1,890,942	1,975,094	2,016,978	Assam	21,014	21,855	48,017	67,256
Burma	67,062,170	95,848,500	75,397,762	78,044,435	Burma	11,988,220	11,670,200	15,043,700	18,055,500
TOTAL	68,605,382	97,739,442	77,372,856	80,061,413	TOTAL	12,009,234	11,692,055	15,091,717	18,122,756

APPENDIX I.

No. 6123-17

GOVERNMENT OF INDIA.

DEPARTMENT OF COMMERCE AND INDUSTRY.

EXPLOSIVES.

Simla, the 30th June 1908.

NOTIFICATION.

In exercise of the powers conferred by Section 5 of the Indian Explosives Act, 1884 (IV of 1884), the Governor General in Council is pleased to make the following amendments in the rules to regulate the transport and importation of explosives published with the notification in this Department, No. 4555-4 (Explosives), dated the 31st May 1907 :—

In schedule A under the heading "Materials required. (*a*) Test-paper :"

(1) the words and figures "weighing, air-dry, about 6·5 grammes per 100 square inches" shall be omitted ;

(2) for the word "cork" the word "corked" shall be substituted.

B. ROBERTSON,

Secretary to the Government of India.

APPENDIX J.

DEPARTMENT OF EXPLOSIVES.

NOTIFICATION.

Dated Calcutta, the 2nd March 1909.

No. 476.—With reference to Notification No. 4555-4, dated the 31st May 1907, of the Government of India, Department of Commerce and Industry, publishing rules to regulate the transport and importation of explosives, the following list of "authorized explosives" referred to in rule 9 (*i*) of the above rules is published for general information :—

LIST OF AUTHORIZED EXPLOSIVES.

The following explosives are at present authorized for importation into British India for general sale :—

Class 1.—GUNPOWDER.

GUNPOWDER.

Class 2.—NITRATE MIXTURE.

AMMONAL.

CHILWORTH SPECIAL POWDER.

Class 3.—NITRO-COMPOUND.

Every explosive in this class and every explosive ingredient thereof shall be so thoroughly purified and otherwise of such character as to satisfy a test known as the heat test, and specified in the rule for testing explosives, published with Notification, No. 4555-4, dated the 31st May 1907, referred to above.

Division 1.

ALBIONITE.
BALLISTITE.
BLASTING GELATINE.
CARBONITE.
CELTITE.
CORDITE.
CORDITE, M. D.
DYNAMITE.
GELATINE DYNAMITE NO. 1.
GELATINE DYNAMITE NO. 2 OR GELIGNITE.
MONOBEL POWDER.
PHŒNIX POWDER.

Provided that every explosive in this division shall be of such character and consistency as not to be liable to liquefaction or exudation.

Division 2.

AMBERITE No. 2.
COOPPAL'S POWDER.
E. C. SPORTING POWDER.
EMPIRE POWDER.
GUNCOTTON.
HENRITE.
IMPERIAL SCHULTZE GUNPOWDER.
NEGRO POWDER.
PICRIC ACID.

PICRIC POWDER.
ROBURITE.
SMOKELESS DIAMOND.
TONITE.

Class 4.—CHLORATE MIXTURE.
Nil.

Class 5.—FULMINATE.
Nil.

Class 6.—AMMUNITION.
Division 1.

PERCUSSION CAPS.
RAILWAY FOG SIGNALS.
SAFETY CARTRIDGES.
SAFETY FUZES FOR BLASTING.
SAFETY ELECTRIC FUZES.

Division 2.

CARTRIDGES FOR CANNON, SHELLS, MINES, BLASTING OR OTHER LIKE PURPOSES.
CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.
ELECTRIC FUZES.
FUZES FOR SHELLS.
TUBES FOR FIRING EXPLOSIVES.
WAR ROCKETS.

Division 3.

CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.
DETONATORS.
ELECTRIC DETONATORS.
FRICTION TUBES.
FUZES FOR SHELLS.
TUBES FOR FIRING EXPLOSIVES.

Class 7.—FIREWORK.
Division 1.
Nil.

Division 2.—Manufactured Fireworks.

MANUFACTURED FIREWORKS.
ALUMINIUM TORCHES.
AMORCES.
CHINESE CRACKERS.
ELECTRIC SPARKLERS.
MAGNESIUM TORCHES.

C. A. MUSPRATT-WILLIAMS, *Major, R. A.,*
Chief Inspector of Explosives in India.

Eleventh Annual Report of the Chief Inspector of Explosives, India.

No. 854.

FROM

LIEUT.-COLONEL C. A. MUSPRATT-WILLIAMS, R.A.,
Chief Inspector of Explosives in India,

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,
DEPARTMENT OF COMMERCE AND INDUSTRY.

Simla, the 6th June 1910.

SIR,

I HAVE the honour to submit herewith a report of the work of my Department during the year ending 31st March 1910.

Number of magazines.

2. During the year 1909, 149 licenses (or 15 more than in the previous year) were granted in British India under Rule 17 of the rules to regulate the manufacture, possession and sale of explosives. The number of magazines licensed was 207 or 21 more than in 1908, and is in excess of the number of licenses granted, because in a number of cases firms have two or more magazines in one place under one license. A statement showing the number and location of the magazines and also the number of licenses granted in British India is given in Appendix A. It will be seen from this statement how widely dispersed these magazines are, and how in some cases they are situated in places very difficult of access, and consequently considerable time has to be spent in getting from place to place, which necessarily, to a certain extent, curtails the number of inspections that can be made during the year.

Inspection of explosives magazines during the year.

3. During the year, 407 inspections of magazines were made; a number of magazines being inspected two or three times. Those magazines are inspected most frequently, which are situated in the neighbourhood of towns or in populous localities, or which contain large quantities of explosives, or any explosive, which on account of its greater susceptibility to decomposition and consequent ignition, it is considered advisable to examine and test more than other explosives. The Roburite Factory at Karachi was also inspected twice.

Condition of magazines.

4. The magazines generally are in good order, and as usual I have found magazine owners most willing to carry out recommendations even when involving considerable expense, and my thanks are due to them for making my duties easy in this respect.

Condition of explosives in magazines.

5. The physical condition of all the explosives in the different magazines during the year was found to be good with the following exceptions, which were found to have deteriorated or to have become defective and were destroyed.

(*a*) 2 cartridges of Monobel Powder from the magazine of Messrs. Atmaram Mulchand and Company at Teruchulam;

(*b*) 78 coils of Safety Fuse from the magazine of the Borea Coal Company at Salanpur;

(*c*) 3 cases of Schultze Powder and 1 case of Amberite from the magazine of the Rangoon Port Commissioners at Kings Bank, Syriam;

(*d*) 4 cases of Monobel Powder from the magazine of the Great Indian Peninsula Railway Company at Mohpani;

(*e*) 14 boxes of Miners safety lighters and 30 seers of caked Gunpowder from the magazine of the Bengal Coal Company at Sitalpur;

(*f*) 75 lbs. Black Powder, 7 cases Signal Lights, and one box Ship's Rockets from the magazine of the Calcutta Port Commissioners at Moyapur;

(*g*) 2 lbs. of Dynamite from the magazine of Messrs. N. D. Harri Ram and Brothers at Dhok;

(*h*) 5 lbs. of Ballistite and 3,600 Electric Detonators from the magazine of Messrs. Gillanders, Arbuthnot and Company at Bally.

The following explosives were ordered to be destroyed:—

(*a*) 10 lbs. of Gunpowder and 1 coil of Safety Fuse from the magazine of the Sitarampur Coal Company at Kalikapur;

(*b*) 475 Electric Detonators from the magazine of the Lutchipur Coal Company at Panchgachia.

(*c*) 88 coils of Safety Fuse from the magazine of the New Birbhum Coal Company at Boria;

(*d*) 102 cartridges of Carbonite from the magazine of the Bengal Coal Company at Sitalpur;

(*e*) 3½ drums of Common Safety Fuse from the magazine of the Shampur Coal Company at Shampur.

Thefts from magazines.

6. During the year, 2 cases of thefts were reported to this Department. The licensed premises of the National Coal Company at Augartapatra were broken into in April 1909 and 47½ lbs. of Gelignite and 140 Detonators were stolen. The licensed premises of the Ghusick and Muslia Collieries, Limited, were broken into in October 1909, and 100 lbs. Compressed Powder, 55 lbs. Dynamite and 500 coils Electric Detonators were stolen. I am of opinion, as stated in previous Annual Reports, that the real reason of these robberies is that explosives so obtained command a ready sale amongst some of the small mine owners, who will not go to the trouble or expense of taking out a license for the possession of explosives, preferring to buy stolen explosives at a cheaper rate than the market rate.

Number of petroleum installations.

7. During the year under report, 478 licenses for the storage of non-dangerous petroleum, regarding which this Department has been concerned or consulted, were granted. This is an increase of 34. A list of these installations, corrected up to date, and showing the districts in which they are located, is given in Appendix B. In addition of course, there are a very large number of storage godowns for the possession of non-dangerous petroleum in non-bulk licensed by District officers of which this Department has no cognizance.

Inspection of petroleum installations during the year.

8. During the year the Chief Inspector of Explosives personally visited the large bulk oil installations at Madras, Karachi, Bombay, Calcutta (Budge-Budge and Narculdanga), Chittagong and Rangoon, and also the oil fields of Burma and Assam. He in addition inspected a number of the minor installations. In all 621 petroleum inspections were made. 83 dangerous petroleum godowns were also inspected by this Department during the year.

Condition of major installations.

9. The large petroleum installations are usually under efficient European supervision and are in good order and well looked after.

10. The small or minor petroleum installations are installations in which not more than 50,000 gallons of kerosine oil in combined bulk and non-bulk are stored, and are looked after by native Agents, employed by the large oil firms. The oil for these installations is supplied from the major installations at the different Ports, and the retail trade is carried out in them. A great deal of inspection of these minor installations has been done by this Department during the last 4 years with the result that their condition is very much improved and the generality of them are in very good order. As a matter of fact, when an installation is found not up to the mark at an inspection, it is usually due to the fact that some new Agent has been recently appointed, who has not realised what is required of him. The Oil Compnaies do not hesitate to change their Agents if several unsatisfactory reports are made of the installations under their charge.

Condition of minor installation.

11. In my last year's report, I stated that in addition to the existing oil companies, *viz.*, the Burma Oil Company and Rangoon Oil Company, 4 new companies, the Indo-Burma Petroleum Company, the Nathsing Oil Company, the Rangoon Refinery Company, and the Twinzas Oil Company had been formed and were exploiting the oil fields. Since then two more companies appear to have been formed, *viz.*, the Aungban Oil Company and the Yenangyaung Oil Company. The Indo-Burma Petroleum Company and the British Petroleum Company, Agents for the Rangoon Refinery Company, have already begun to erect installations in India for the storage of petroleum. The expansion of the oil fields is very observable to any one who makes a yearly trip in one of the Irrawaddy Flotilla Company's steamers from Mandalay to Prome. A few years ago, when approaching Yenangyaung, a few oil derricks could be seen against the horizon and here and there a storage tank on the banks of the river, and these might easily have escaped attention, but now this is impossible, as the derricks have so increased in number that they resemble a mighty forest, and large storage tanks, perched on the hilly banks of the Irrawaddy, obstruct the view in all directions. The different Oil Companies are erecting these oil tanks in feverish haste so as to be ready for any great find of oil, and it is to be hoped that their anticipations may be realised, but I am afraid that the productivity of the oil-bearing strata is being subjected to a somewhat severe strain. While in Burma, I was given to understand that the Burma Oil Company's pipe line from the oil fields to Rangoon was working very satisfactorily, and I congratulate the firm on the way the very great difficulties met at the outset have all been surmounted.

Oil trade expansion.

12. No explosions or accidents have occurred during the year under review in the magazines or in the one Explosives Factory (The Roburite Factory at Karachi) licensed in British India. A list of accidents that have occurred with explosives, inflammable substances, dangerous goods, etc., between the 1st January and 31st December 1909, and that have been reported to this Department is given in Appendix C and gives a short account of each one. It will be seen from a perusal of the details that the accidents have practically all been caused by gross neglect of ordinary precautions. In all there were 71 accidents, causing 68 deaths, and injuries to 118 persons. Comparative statements given in Appendices D and E show the total number of accidents and the number of persons killed or injured by them during the last 5 years. As stated in my previous reports it is very doubtful whether all accidents that occur are duly reported to this Department, and therefore it is very possible that the statistics given are underestimated. I notice that in some parts of India accidents appear more prevalent than in others, but I am inclined to think that such difference may be occasioned by the local authorities in some places being more careful in carrying out instructions to report accidents than they are in others.

Accidents.

13. There were 15 Gunpowder accidents during the year, causing 19 deaths, and injuries to 26 persons. The native manufacturers of gunpowder and fireworks appear to treat these articles as if they were absolutely innocuous, with the result that there are constantly vacancies in their home circles.

Gunpowder, class I.

14. Nitro-compounds were responsible for 4 accidents, causing 1 death, and injuries to 5 persons.

Nitro-compounds, class III.

15. Two accidents occurred with explosives of the ammunition class, and 2 persons were injured thereby. One of these accidents (see Serial No. 20 of Appendix C) shows how careful it is necessary to be in handling detonators.

Ammunition, class VI.

16. Nineteen accidents from fireworks were reported to this Department, causing 21 deaths, and injuries to 41 persons. Most of the accidents are caused by the sulphur chlorate combination of fireworks, which is an extremely sensitive one, and which is prohibited in England.

Fireworks, class VII.

In 1899 I recommended the prohibition in India of this class of fireworks, but the Government of India, after due consideration of all the points at issue, decided not to prohibit them. The question of their prohibition is now again under the consideration of the Government of India, as the mixture has been very considerably used as the exploding agent in bombs.

17. There were 23 accidents from petroleum during the year, which were responsible for 17 deaths and injuries to 25 persons. It will be seen from the details of these accidents given in Appendix C (Serial Nos. 41 to 63) that carelessness is a prominent feature in most of them, and that they are caused usually by lights being brought into proximity to oil vapour, to kerosine lamps being upset or falling down from walls, and to kerosine being poured on to fires or into lighted lamps.

Petroleum.

A very serious disaster causing considerable loss of life occurred on the Irrawaddy River on the 13th January 1910, and though properly speaking this happened after the year under review had ended, I think it advisable to refer to it in the present annual report, while the facts of the case are still fresh in the public memory. The S. S. "Kashmir", a brand-new steamer of the Irrawaddy Flotilla Company, burning oil fuel, had got to Dedaye, the first stopping place from Rangoon, on her maiden trip at about 7-30 P.M. After discharging her passengers and cargo, she had gone out into midstream and dropped anchor for the night. The engines were going dead slow while the steamer was taking the strain on her anchor when a fire broke out in the stokehold and in a few minutes the whole steamer was ablaze and had to be abandoned. Further loss of life occurred later when a creek steamer came near and endeavoured to put out the fire. I was directed by the Government of Burma to hold an investigation and to make a report on the same. A public enquiry was also held at Rangoon by a Court, consisting of the District Magistrate and three other members, which I attended and submitted to it in original my report to the Government of Burma. As this report was made public and contains a full account of the accident and also gives details of the nature of the "astatki" the steamer was burning and of the construction of the vessel, it may be of some general interest, and I give it in full in Appendix H. The proceedings of the Court have now been published and the Court have practically adopted the opinion I gave as to the cause of the accident and have embodied in their report the suggestions I made for the prevention of further accidents of this kind.

18. During the year Government have been very free from accidents as particulars of only one accident at the Kirkee Ammunition Factory, causing the death of one man and injuries to four others, were received by this Department.

Government accidents.

19. I regret that I am unable to give a record of the imports of explosives imported into British India during the year 1909, as the *data* given to me in one of the statements from a maritime port are so obviously incorrect that it is no use tabulating them, and I cannot hold back my report till correct statistics arrive.

Import of Explosives.

Import of Petroleum.

20. During the year under report, 144, 937 gallons of dangerous petroleum and 85,148,597 gallons of non-dangerous petroleum were imported by sea into British India. The details are given in Appendix G, and also the quantity of dangerous and non-dangerous petroleum produced in Assam and Burma during the year.

Explosives and Petroleum Rules.

21. No important amendments were made in these rules during the year, but a certain number of proposed amendments of importance are at present under the consideration of the Government of India and will be dealt with in next year's report.

Authorised Explosives.

22. A list of explosives at present authorised for importation into British India for general sale, has been published in the *Gazette of India* for information. This list is given in Appendix I.

23. The number of inspections done by this Department this year is a record one, *viz.*, one thousand one hundred and eleven, and again I cannot speak too highly of the services of the two Inspectors of Explosives, Captain J. S. Rush and Captain J. W. Turner, who in addition to their ordinary work have been frequently called away in the middle of inspection tours to examine suspected substances, and give evidence in Courts in connection with outrages. Their work for the last three years has been onerous and hazardous.

I have the honour to be,

Sir,

Your most obedient servant,

C. A. MUSPRATT-WILLIAMS,

Lieutenant-Colonel, R.A.,
Chief Inspector of Explosives in India.

APPENDIX A.

List of Magazines and Licenses granted under Rule 17 of the Explosives Rules for the year 1909.

Presidency or Province.	District.	Magazines			Licenses		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Ajmer-Merwara	Ajmer	1	...	1	1	...	1
	Total	1	...	1	1	...	1
Bengal	Burdwan	20	2	22	17	2	19
	Darjeeling	3	...	3	3	...	3
	Gaya	2	1	3	2	1	3
	Hazaribagh	14	2	16	12	1	13
	Hooghly	4	...	4	1	...	1
	Howrah	1	...	1	1	...	1
	Manbhum	17	3	20	15	2	17
	24-Parganas	2	...	2	1	...	1
	Singbhum	3	2	5	2	1	3
	Total	66	10	76	54	7	61
Bombay	Ahmedabad	2	1	3	2	1	3
	Bombay	19	...	19	12	...	12
	Dharwar	2	8	10	1	4	5
	Karachi*	10	...	10	5	...	5
	Kolaba	1	1	2	1	1	2
	Panch Mehals	1	...	1	1	...	1
	Thana	...	1	1	...	1	1
	Total	35	11	46	22	7	29
Burma	Hanthawaddy	3	...	3	2	...	2
	Mergui	1	...	1	1	...	1
	Ruby Mines	1	...	1	1	...	1
	Rangoon	1	...	1	1	...	1
	Yamethin	...	1	1	...	1	1
	Total	6	1	7	5	1	6
Central Provinces	Balaghat	1	...	1	1	...	1
	Betul	...	2	2	...	1	1
	Bhandara	...	1	1	...	1	1
	Bilaspur	1	...	1	1	...	1
	Chindwara	1	1	2	1	1	2
	Jubbulpur	3	...	3	2	...	2
	Nagpur	5	...	5	3	...	3
	Narsingpur	2	...	2	1	...	1
	Raipur	4	...	4	4	...	4
	Total	17	4	21	13	3	16
Eastern Bengal and Assam	Cachar	2	...	2	1	...	1
	Lakhimpur	1	...	1	1	...	1
	Total	3	...	3	2	...	2
Madras	Anantapur	3	...	3	2	...	2
	Chingleput	3	...	3	2	...	2
	Kistna	1	...	1	1	...	1
	Madras	19	...	19	5	...	5
	Nellore	4	...	4	2	...	2
	Niligris	2	...	2	1	...	1
	Tanjore	2	1	3	2	1	3
	Trichinopoly	3	1	4	3	1	4
	Vizagapatam	5	...	5	3	...	3
	Total	42	2	44	21	2	23
Punjab	Rawal Pindi	1	...	1	1	...	1
	Total	1	...	1	1	...	1

*At Karachi there is in addition a Roburite Factory licensed under Rule 15.

Presidency or Province.	District.	Magazines: Under renewed license.	Magazines: Under new license.	Magazines: Total.	Licenses: Renewed.	Licenses: New.	Licenses: Total.
United Provinces	Cawnpur	1	...	1	1	...	1
	Dehra Dun	1	...	1	1	...	1
	Gharwal	2	1	3	2	1	3
	Lucknow	1	...	1	1	...	1
	Meerut	1	...	1	3	...	3
	Shahjehanpur	1	...	1	1	...	1
	Total	7	1	8	9	1	10
SUMMARY.							
Ajmer-Merwara		1	...	1	1	...	1
Bengal		66	10	76	54	7	61
Bombay		35	11	46	22	7	29
Burma		6	1	7	5	1	6
Central Provinces		17	4	21	13	3	16
Eastern Bengal and Assam		3	...	3	2	...	2
Madras		42	2	44	21	2	23
Punjab		1	...	1	1	...	1
United Provinces		7	1	8	9	1	10
	GRAND TOTAL	178	29	207	128	21	149

Summary of Magazines and Licenses granted under Rule 17 of the Explosives Rules for the ten years ending 1909.

	Magazines: Under renewed license.	Magazines: Under new license.	Magazines: Total.	Licenses: Renewed.	Licenses: New.	Licenses: Total.
1900	73	11	84	84	10	94
1901	76	10	86	83	11	94
1902	121	26	147	85	19	104
1903	129	17	146	87	14	101
1904	138	12	150	96	9	105
1905	139	15	154	95	13	108
1906	150	19	169	105	15	120
1907	164	9	173	118	8	126
1908	167	19	186	119	15	134
1909	178	29	207	128	21	149

APPENDIX B.

**List of non-dangerous petroleum installations licensed during the year 1909.*

Province.	District.	No.
Ajmer-Merwara	Ajmer	4
	TOTAL	4
Baluchistan	Quetta	1
	TOTAL	1
Bengal	Balasore	3
	Bhagulpur	5
	Birbhum	1
	Burdwan	7
	Calcutta	4
	Champaran	1
	Cuttack	3
	Darbhanga	3
	Darjeeling	2
	Gaya	4
	Howrah	3
	Khulna	1
	Manbhum	4
	Midnapur	2
	Monghyr	2
	Mozufferpur	5
	Murshedabad	1
	Nadia	4
	Patna	4
	Purnea	6
	Sambalpur	4
	Saran	3
	Shahabad	3
	Sonthal Pargana	6
	24-Parganas	8
	TOTAL	89
Bombay	Ahmedabad	5
	Ahmednagar	3
	Belgaum	6
	Bijapur	6
	Bombay	4
	Broach	5
	Dharwar	11
	Hyderabad	1
	Karachi	6
	Khandesh, East	3
	Khandesh, West	5
Bombay—*contd.*	Nasik	5
	Poona	3
	Satara	3
	Sholapur	3
	Surat	6
	Thana	4
	TOTAL	79
Burma	Hanthawaddy	6
	Magwe	8
	Mingyin	1
	Pokkoku	2
	Thayetmyo	1
	Prome	1
	TOTAL	19
Central Provinces	Akola	6
	Amraoti	6
	Bhandara	4
	Bilaspur	2
	Buldana	9
	Chanda	2
	Damoh	2
	Hoshangabad	4
	Jubbulpur	6
	Nagpur	4
	Narsinghpur	3
	Nimar	5
	Raipur	2
	Saugor	3
	Seoni	2
	Wardha	9
	TOTAL	69
Eastern Bengal and Assam	Backergunge	1
	Bogra	1
	Chittagong	5
	Dacca	1
	Dinajpur	3
	Jalpaiguri	2
	Lakhimpur	1
	Pabna	3
	Rajshahi	3
	Rangpur	3

*This list includes some godowns for the storage of non-dangerous petroleum regarding which this Department has cognizance.

Province.	District.	No.
Eastern Bengal and Assam —*contd.*	Sylhet	1
	TOTAL	24
Madras	Anantapur	2
	Bellary	4
	Chingleput	4
	Coimbatore	7
	Cuddapah	2
	Ganjam	4
	Godavery	4
	Guntur	3
	Kistna	3
	Kurnool	2
	Madras	8
	Madura	6
	Malabar	11
	Nellore	3
	North Arcot	2
	Salem	2
	South Arcot	8
	Tanjore	8
	Tinnevelly	7
	Trichinopoly	3
	Vizagapatam	2
	TOTAL	95
Mysore	Bangalore	8
	TOTAL	8
N.-W. Frontier Province	Peshawar	3
	TOTAL	3
Punjab	Amritsar	3
	Delhi	4
	Jullunder	2
	Lahore	3
	Ludhiana	3
	Multan	1
	Rawal Pindi	3
	Sialkot	3
	Umballa	6
	TOTAL	28
United Provinces	Agra	4
	Aligarh	2
	Allahabad	3
	Azamgarh	1
	Bahraich	1
	Bara Banki	1
	Bareilly	4
	Basti	3
	Benares	3
	Ballia	1
	Cawnpur	3
	Etawah	3
	Fyzabad	3
	Ghazipur	1
	Gonda	2
	Gorakhpur	3
	Jaunpur	1
	Jhansi	3
	Lucknow	3
	Meerut	4
	Moradabad	3
	Muttra	1
	Shaharanpur	3
	Shahjehanpur	3
	TOTAL	59

SUMMARY.

AJMER-MEEWARA	4
BALUCHISTAN	1
BENGAL	89
BOMBAY	79
BURMA	19
CENTRAL PROVINCES	69
EASTERN BENGAL AND ASSAM	24
MADRAS	95
MYSORE	8
NORTH-WEST FRONTIER PROVINCE	3
PUNJAB	28
UNITED PROVINCES	59
TOTAL	478

Summary of non-dangerous petroleum installations licensed for the five years ending 1909.

Province.	1905.	1906.	1907.	1908.	1909.
Ajmer-Merwara	3	3	3	4	4
Baluchistan	...	...	1	1	1
Bengal	67	74	74	79	89
Bombay	65	64	76	82	79
Burma	10	11	12	17	19
Central Provinces	49	49	67	66	69
Eastern Bengal and Assam	11	14	16	21	24
Madras	49	57	89	97	95
Mysore	...	...	...	...	8
North-West Frontier Province	1	3	3	3	3
Punjab	9	12	23	26	28
United Provinces	44	44	47	48	59
TOTAL	308	331	411	444	478

APPENDIX C.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1909 to 31st December 1909.

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons.	
					Killed.	Injured.
			Explosives.			
1	2nd Jan. 1909	Gunpowder .	Kottapadi . .	The District Magistrate reported that some gunpowder was exposed to dry in a yard, and as it rained, the gunpowder was hurriedly taken and placed in a room when an explosion occurred. The cause of the explosion is not known, but the probability is that it occurred through the presence of naked lights. Five men died from burns and four were injured.	5	4
2	4th Feb. 1909	„ .	Salem . .	The District Magistrate reported that while "adiravidis" (small iron tubes filled with gunpowder) were being fired, one of them exploded and injured three persons.	...	3
3	21st Feb. 1909	„ .	„ . .	The District Magistrate reported that the ingredients of blasting powder were being mixed in a mortar when the mixture exploded injuring three men who died subsequently.	3	...
4	21st Mar. 1909	„ .	„ . .	The District Magistrate reported that a native was blasting a well, and one of the charges having failed, the coolies attempted to open it in spite of warnings. In doing so the charge exploded and a cooly was seriously injured.	...	1
5	25th Apl. 1909	„ .	Conjeeveram .	The District Magistrate reported that, while gunpowder was being made for fireworks an explosion occurred injuring five men who were engaged in the work, four of whom subsequently died. The explosion is attributed to the process of grinding the powder.	4	1
6	27th Apl. 1909	Blasting Powder	Taungzun, Burma.	The Deputy Commissioner, Thaton, reported, that a native used a steel jumper for ramming a charge of blasting powder instead of a copper rod when an explosion occurred severely injuring the man and a cooly.	...	2
7	8th May 1909	Gunpowder .	Tiruttani, North Arcot.	The District Magistrate reported that an explosion occurred in a firework seller's house. It appears he spread gunpowder and red fires in the sun to dry, when the explosion occurred, but it is presumed that the explosion occurred through the licensee carelessly handling the gunpowder.	...	3
8	17th May 1909	„	Andheri, Thana District.	The Superintendent of Police reported that a native placed an earthen jar on the top of a small ladder at the Railway station and went to buy his ticket. On his return he sat by the ladder to light a "bidi," but must have shaken the jar in some way as it fell to the ground and there was an explosion causing injuries to the man. On enquiry it was ascertained that the jar in question must have been used for storing powder, etc., during the rains, and that some of the explosive must have adhered to the jar, and being warmed by the sun, had exploded when the jar fell.	...	1
9	19th May 1909	„ . .	Sirapalli, Salem .	The District Magistrate reported that while a native was manufacturing blasting powder, it suddenly ignited and three persons were burnt.	...	3
10	17th June 1909	„ . .	Moheshpur, Jessore	The Inspector of Police reported that a man was making fireworks and some of the fire from his hookah fell on some gunpowder by him, which exploded fatally, injuring the man and slightly injuring his son who was near by.	1	1
11	4th July 1909	„ .	Madura . .	The Magistrate reported that a native placed some gunpowder in the sun to dry. A thatched kitchen near by caught fire and the flames spread to the powder which caused it to explode and the man was fatally injured.	1	...
12	11th July 1909	„	Pudupolyam, Salem	The District Magistrate reported that three natives were manufacturing gunpowder which, whilst being pounded, exploded injuring them. Two of the men subsequently died from the effects of the injury.	2	1
13	19th July 1909	„	Salem . .	The Magistrate reported that a native was standing near a basket in which powder was kept, when fire was brought to light a fuse attached to a blasting charge, and a spark fell on the basket containing the powder and exploded it causing fatal injuries.	1	...
14	10th Aug. 1909	„	„ . . .	The District Magistrate reported that two native boys were grinding gunpowder in a stone mortar with a crow-bar when the powder exploded, fatally injuring both of them.	2	...
15	10th Nov. 1909	„	„ . . .	The Magistrate reported that a native was firing "adiravidis" (small iron tubes filled with gunpowder and fitted into a wooden plank) when one of the tubes burst and injured him.	...	1
				TOTAL .	19	26

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons.	
					Killed.	Injured.
			Explosives—*contd.*			
16	29th June 1909	Dynamite .	Taungzun, Burma	The Deputy Commissioner, Thaton, reported that a native lit three fuses connecting with three separate charges of dynamite placed in bore holes; after two charges exploded the man waited a little and then approached the unexploded charge, when it exploded and severely injured him.	...	1
17	21st Sept. 1909	Gelignite .	Bombay . .	The Commissioner of Police, reported that a Port Trust barge was engaged in blasting rock in the sea off Mody Bunder in about 25 feet of water; after the charge had been laid six men were standing on a staging attached to the barge which was moved away to a distance of 135 feet and were engaged in holding the blasting wires. The charges were fired and immediately about 12 feet of the staging was blown some distance into the air, and some of the pieces falling killed one of the six men, and two others received slight injuries. There were 12 bore holes, and the charges were one of 9 lbs., one of 3 lbs. and the remainder of 5½ lbs. each.	1	2
18	3rd Oct. 1909	Dynamite .	Salem . .	The District Magistrate reported that while a native was blasting a rock, one of the loaded holes, which had not previously been discharged, suddenly exploded and caused injuries to the man.	...	1
19	29th Oct. 1909	„ . .	„ . . .	The District Magistrate reported that while a native was blasting a rock near a loaded hole, which had not been properly discharged, an explosion took place and caused him injuries.	...	1
				TOTAL .	1	5
20	23rd June 1909	Detonator .	Bombay . .	The Commissioner of Police reported that a Goanese was trying to clean out the inside of a detonator with a piece of wire, when it exploded, cutting off the top joint of the fore-finger, shattering the top joint of the thumb and two joints of the second finger of the left hand, severely lacerating the right hand, and inflicting wounds over the right eye, below the chin and on the stomach.	...	1
21	1st Aug. 1909	Ammunition .	„ . . .	The Commissioner of Police reported that a native, while sorting out copper and brass pieces from a heap of rubbish and breaking them up with a hammer on a piece of iron, picked up a small brass tube which looked like a small brass cartridge, with a bullet in it, and struck it with the hammer, when it exploded and injured him severely.	...	1
				TOTAL .	...	2
22	15th Jan. 1909	Bomb consisting of chlorate of potash and sulphide of arsenic, and French wire nails.	Poona . .	The District Magistrate reported that a native found a paper parcel tied with a string and on removing the cover he found a cocoanut which he tried to break by striking it on the road. On the second knock the cocoanut exploded causing him severe injuries.	...	1
23	1st March 1909	Bomb consisting of a sulphur chlorate mixture.	24-Parganas .	The Superintendent of Police reported that a native lad was throwing the bombs (fireworks) in his house when one of the bombs exploded blowing off his left index finger and setting fire to his clothes. Two others standing near were slightly injured.	...	3
24	13th May 1909	Crackers . .	Kottayam, Travancore.	As a bridal party was returning from church, a boy who had some 200 crackers with him, fell down and all of them exploded at once, injuring the boy fatally and wounding some eight of the bystanders. (Newspaper.)	1	8
25	16th June 1909	Firework .	Tiruttaraippandi, Tanjore.	The District Magistrate reported that an explosion occurred when two men were engaged in turning over firework composition which had been exposed to the sun. It is reported that the composition caught fire and injured the two persons. The firework composition consisted of saltpetre, charcoal, sulphur and eggs.	1	1
26	27th July 1909	Firework mixture consisting of sulphur and chlorate of potash.	Salem . . .	The District Magistrate reported that a native was grinding the ingredients on a stone when the mixture exploded, injuring him severely and also his son who was near by.	...	2
27	9th Sept. 1909	Firework composition, chlorate of potash and momchal (yellow sulphide of arsenic.)	Calcutta . .	The Commissioner of Police reported that a native lad was mixing the composition when it took fire and burnt him on the hands and face.	...	1

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons.	
					Killed.	Injured.
Explosives—*concld.*						
28	12th Sept. 1909	Fireworks consisting of saltpetre, sulphur and charcoal.	Calcutta . .	The Commissioner of Police reported that while some fireworks were being let off, the sparks from one of them fell on to other fireworks kept in two baskets near by, which also took fire and exploded, fatally injuring six of the eight men who were near by.	6	2
29	20th Oct. 1909	Firework composition. Red arsenic and chlorate of potash.	Bombay . .	The Commissioner of Police reported that a man was pressing and mixing the composition in a brass *lotah* when an explosion occurred fatally injuring him.	1	...
30	22nd Oct. 1909	Firework . .	Calcutta .	The Inspector of Police, reported that a man was mixing some chlorate of potash and sulphur in a porcelain mortar with a pestle when an explosion occurred injuring the man and two servants who happened to be near him.	...	3
31	25th Oct. 1909	Fireworks consisting of chlorate of potash, sulphide of arsenic and sulphur.	Sokkampatti, Madura.	The District Magistrate reported that a native was making fireworks and placed some packets under his thigh and the pressure to which they were subjected caused an explosion resulting in the death of three persons and the wounding of eight others.	3	8
32	3rd Nov. 1909	Fireworks (chlorate of potash and sulphide of arsenic).	Tollygunge . .	The Superintendent of Police reported that two native lads were preparing fireworks consisting of chlorate of potash and sulphide of arsenic, when an explosion occurred fatally injuring one and seriously injuring the other.	1	1
33	7th Nov. 1909	Fireworks consisting of sulphide of arsenic and chlorate of potash.	Idumbavanam, Tanjore.	The District Magistrate reported that two men were mixing the composition on a stone with a pestle when it exploded fatally injuring one and seriously injuring the other.	1	1
34	11th Nov. 1909	Fireworks, Vengayavesdis, consisting of sulphide of arsenic and chlorate of potash wrapped up in a paper and bound with string.	Maunargudi, Tanjore.	The District Magistrate reported that a native purchased five or six of these fireworks and was showing them to another native when of one the fireworks dropped down and exploded injuring the two men.	...	2
35	12th Nov. 1909	Crackers (chlorate of potash and sulphide of arsenic).	Tanjore . .	The District Magistrate reported that a native lad purchased some crackers and finding them damp, he collected the powder, put it into receptacles made of palmyra leaves and set fire to it. Before he could get to a safe distance, there was an explosion which caused injuries to the lad.	...	1
36	12th Nov. 1909	Fireworks, consisting of chlorate of potash and red sulphide of arsenic.	Calcutta . .	The Inspector of Police reported that a native lad, whilst firing some fireworks, sustained injuries to his right hand in which he was holding some throw down crackers which exploded owing to his having forgetfully applied pressure to them.	...	1
37	24th Nov. 1909	Fireworks (chlorate of potash and sulphide of arsenic.)	North Arcot .	The Magistrate reported that a native was making fireworks consisting of chlorate of potash and realgar when an explosion occurred fatally injuring him.	1	...
38	7th Dec. 1909	Fireworks .	Begumgunge, Noakhali.	The Magistrate reported that a licensed firework manufacturer was, by the light of a kerosine lamp, arranging and counting his fireworks when one of the fireworks caught fire from the lamp and all exploded at once. Of the eight occupiers of the house, who were injured, six died from the injuries received.	6	2
39	25th Dec. 1909 .	Fireworks (chlorate of potash and sulphur).	Belgachia, Calcutta	The Inspector of Police reported that a native poured a mixture of chlorate of potash, sulphur and charcoal into an iron tube, and while pressing the mixture, it exploded, severely injuring him on his hands, with the result that the left forearm had to be amputated.	...	1
40	27th Dec. 1909 .	Firework composition, consisting of sulphur and chlorate of potash.	Bombay . .	The Commissioner of Police reported that a native was grinding the composition on a stone, when an explosion occurred shattering his right hand and fracturing the arm. A woman and a child who were standing near by were also injured.	...	3
				Total .	21	41

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons.	
					Killed.	Injured.
			Petroleum.			
41	Mar. 1909 .	Kerosine . .	Insein . .	A girl was pouring some kerosine oil into a stove which was alight at the time, when some of the oil upset and caught fire, and set her clothes ablaze. She was so seriously injured that she died from the effects.	1	...
42	18th Mar. 1909 .	„	Bombay . .	The Commissioner of Police reported that a native was filling a lamp after removing the burner with the wick alight; a gust of wind blew the flame from the burner on to the oil and set it alight. On this the man dropped both lamp and bottle containing the oil on the floor, and the bottle breaking, the burning oil spread all over the room, setting the clothes of those in the room on fire, and all three men were burnt, one succumbing to his injuries.	1	2
43	19th Mar. 1909 .	„	„	The Commissioner of Police reported that a lighted lamp in a chowki, fell into one of four buckets of oil kept below the lamp which caused a fire, injuring a man and woman.	...	2
44	17th Apl. 1909 .	„	„	The Commissioner of Police reported that a native child was sleeping near a lighted kerosine oil lamp on a small wooden stand. The mother, who was outside the hut, heard the child screaming, and on going in found the child's clothing in flames and saw a cat running out and the lamp knocked down. The child died from its injuries.	1	...
45	6th May 1909 .	„	„	The Commissioner of Police reported that while a woman was lighting her lamps, some oil, which had leaked out from a lamp, caught fire and set her clothes on fire, causing her injuries.	...	1
46	7th May 1909 .	„	„	The Commissioner of Police reported that a fire broke out in a brass foundry owing to the bursting of an oil can on an oil engine, and the oil spilling on the engine caught fire. The owner and a servant who were near the engine were fatally injured by burns.	2	...
47	27th May 1909 .	Petrol . .	„	The Commissioner of Police reported that a chauffeur of a motor car took out a gallon-can of petrol from the car, out of which he poured some into the tank of the car and placed the can on the road, intending to put it back after he had closed the tank. A crowd had collected, and while the chauffeur was fastening down the tank, some one in the crowd carelessly threw a lighted match or biree near or on the can, which set the petrol on fire. The chauffeur and a police-man who was keeping the crowd back were slightly burnt.	...	2
48	28th May 1909 .	Kerosine . .	Poona . .	The District Magistrate reported that a party of natives were returning from a dance, and as it was dark they carried a torch light. The torch bearer dipped the burning torch in an open vessel of kerosine oil, when the oil at once ignited, and the flames set on fire the clothes of the torch bearer and five other persons who were with him burning them. Two of the injured died and the rest recovered.	2	4
49	18th June 1909.	„ . .	Bombay . .	The Commissioner of Police reported that a Mahomedan woman poured some kerosine oil on to a lighted fire, when the flames shot up and set her hair on fire, and before assistance could be rendered her clothing also caught fire, and she was so extensively burnt that she died from the effects.	1	...
50	28th July 1909.	„ . .	„ . .	The Commissioner of Police reported that while a native woman was asleep on her cot, a lighted kerosine oil lamp was knocked on her probably by a cat, setting her clothes on fire. She was severely burnt about the body and died from the burns.	1	...
51	27th Aug. 1909.	Petrol . .	Madras . .	A fire occured in the Burma Oil Co's premises at Madras in a shed in which drums of petrol are refilled. It appears two boys were in the shed, one pumping the petrol into the filter, and another filling and weighing the drums, while a man was standing outside the entrance and boy was filing a hot bolt about four feet from the door. A flash suddenly occurred in the shed, and the whole contents of the place, about 35 drums of petrol, were at once in a blaze. Most of the drums exploded without much violence, and some drums that were outside the shed, although much bulged by the vapour evolved by the heat did not explode or burn. All four coolies were severely burnt, and two of them died afterwards from the injuries.	2	2
52	2nd Sept. 1909 .	Kerosine . .	Calcutta . .	The Commissioner of Police reported that a man was filling a lighted lamp with kerosine when the oil came in contact with the flame and the tin of oil caught fire and the man was severely burnt.	...	1

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
Petroleum—*concld.*						
53	19th Sept. 1909.	Kerosine . .	Bombay . .	The Commissioner of Police reported that a lighted kerosine lamp accidentally upset on a woman lying on a bed, setting her clothes on fire and burning her extensively about her body. The husband also sustained burns in attempting to extinguish the fire.	...	2
54	11th Oct. 1909 .	,, . .	,, . .	The Commissioners of Police reported that a native woman dropped a lighted kerosine lamp on the floor, and the flames set fire to her clothing and to that of two men who came to her assistance. All three got badly burnt.	...	3
55	16th Oct. 1909 .	Crude petroleum .	Nyaunghla . .	The Deputy Commissioner, Magwe, reported that a man was fixing a bolt to a lightning conductor in an oil storage tank. There was a small quantity of oil in the tank at the time which was giving off gas. The man was overcome by the fumes and fell senseless into the tank. Two other coolies seeing what had happened entered the tank, fastened a rope round the first man's body and pulled him out. Both these coolies, on emerging from the tank, fell down senseless, but recovered consciousness. The first man never recovered consciousness.	1	2
56	31st Oct. 1909 .	Kerosine . .	Bombay . .	The Commissioner of Police reported that a native woman who had an open kerosine oil lamp in her hand was lighting a fire in the fireplace when she fell in a fit on the floor, and the lamp fell on her left foot and burnt it so severely that she died from the effects.	1	...
57	9th Nov. 1909 .	,, . .	,, . .	The Commissioner of Police reported that a little native girl while asleep accidently kicked over a kerosine oil lamp, and her clothes catching fire she succumbed to her burns.	1	...
58	17th Nov. 1909 .	,, . .	,, . .	The Commissioner of Police reported that a native girl was playing with a small kerosine oil lamp when she accidentally set fire to her clothes and burnt herself fatally.	1	...
59	21st Nov. 1909 .	,, . .	,, . .	The Commissioner of Police reported that a native, who was said to be insane, set fire to his clothes and burnt himself about the body.	...	1
60	25th Nov. 1909 .	,, . .	,, . .	The Commissioner of Police reported that a native woman burnt herself fatally by lighting a stove with a match after pouring kerosine oil on it. The flames set her clothes on fire and burnt her about the body.	1	...
61	2nd Dec. 1909 .	,, . .	,, . .	The Commissioner of Police reported that a native was seated close to a naked kerosine oil lamp and his clothes caught fire and he got severely burnt. His brother in rendering assistance also got slightly burnt.	...	2
62	19th Dec. 1909 .	,, . .	,, . .	The Commissioner of Police reported that while a native girl was pouring kerosine oil into a lighted lamp, the oil flared up, and her clothes catching fire she was badly burnt.	...	1
63	30th Dec. 1909 .	Petrol vapour .	Bombay harbour .	A barge which had a tindal, seven lascars and a Police Inspector on board, having been loaded with 3,500 tins of petrol from a steamer, proceeded in tow of a launch. The hatches were battened down, and tarpaulins put over them. Shortly after leaving, an explosion took place in the after end hatch of the barge containing rope, etc. The force of the explosion lifted the hatch, and two lascars who were seated on it fell into the water. The flames which accompanied the explosion were only momentary, but they severely burnt the tindal, who succumbed to his injuries. It is presumed that there was some vapour in the hatch and that light must have been brought near it.	1	...
				Total .	17	25
Chemicals.						
64	15th Feb. 1909 .	Sulphide of arsenic, etc.	Lahore . .	The Deputy Commissioner reported that a native had filled an iron cylinder about a foot long with yellow sulphide of arsenic, mercuric sulphide, carbonate of ammonia, alum, borax, sulphate of copper, rock salt, etc., and after closing the mouth of the cylinder placed it on a fire. Vapour of some kind was seen escaping from the top of the cylinder, to prevent the escape of which he applied some mud on the part, with the result that the bottom of the cylinder was burst open and caused injuries to two persons.	...	2

No.	Date of accident.	Nature of chemicals.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons.	
					Killed.	Injured.
Chemicals—*concld.*						
65	25th May 1909 .	Methylated spirits	Calcutta . .	The Commissioner of Police reported that as an electric tramcar came in front of a shop in which methylated spirits were stored, a loud report was heard inside the shop followed by a blaze. It was ascertained afterwards that about 200 bottles of methylated spirits which were on a shelf in the verandah of the shop exploded one after another in quick succession, but some casks of the spirits were found intact inside the shop. A lad of 10 years was found dead inside the shop, and a passer-by was also found dead on the footpath ; both had marks of burning on their persons. The driver of the tramcar together with four other persons were injuried. It was thought that the vapour must have been escaping from the bottles, and that it caught fire from a spark from the electric tramway or that the boy inside the shop must have by some act of his set the vapour on fire.	4	3
66	4th Sept. 1909 .	Chlorate of potash and dioxide of manganese.	Rangoon . .	The Deputy Commissioner reported that an explosion occurred in a school where a cinematograph entertainment was about to be given. The explosion was due to a pipe of the gas generator being choked up with rust.	2	1
				Total .	6	6
Miscellaneous.						
67	21st Apl. 1909 .	Coal . .	Bombay . .	The Commissioner of Police reported that while coal was being removed from a hatch of a steamer, all of a sudden the coal blazed up. The cause was due either to spontaneous ignition of the coal or to a light being brought near and igniting the coal gas.	2	11
68	23rd Apl. 1909 .	Do. . .	Do. . .	The Commissioner of Police reported that an explosion took place in a hatch of a steamer loaded with coal. The coal at the bottom of the hatch was found to be smouldering. No lives were lost as the labourers were not at work at the time of the explosion and the cause was probably due to spontaneous ignition.	...	...
69	3rd June 1909 .	Matches . .	Do. . .	The Commissioner of Police reported that while a child was playing with a box of safety matches, the matches ignited and set fire to her clothes. The mother ran to the child to extinguish the flames, and in doing so, her own clothes caught fire, burning her somewhat severely.	...	2
70	11th Nov. 1909 .	Do. . .	Do. . .	The Commissioner of Police reported that a little native lad, in trying to light some fireworks with matches, set fire to the clothing of his sister who was lying asleep. The girl was so seriously injured that she died from the effects.	1	...
71	13th Nov. 1909 .	Do. Bengal lights.	Do. . .	The Commissioner of Police reported that a little native child met with her death by playing with matches which set fire to her clothes and burnt her fatally.	1	...
				Total .	4	13

Summary of accidents during the year 1909.

Explosives or dangerous and inflammable substances.	ACCIDENTS CAUSING LOSS OF LIFE AND BODILY INJURY.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons			
		Killed.	Injured.		
EXPLOSIVES.					
Gunpowder	15	19	26	...	15
Nitro-compounds	4	1	5	...	4
Ammunition	2	...	2	...	2
Fireworks	19	21	41	...	19
TOTAL	40	41	74	...	40
PETROLEUM.					
Petroleum generally	23	17	25	...	23
TOTAL	23	17	25	...	23
Chemicals	3	6	6	...	3
TOTAL	3	6	6	...	3
Miscellaneous	4	4	13	1	5
TOTAL	4	4	13	1	5
GRAND TOTAL	70	68	118	1	71

APPENDIX D.

Detailed statement showing the number of accidents and persons killed and injured during the five years 1905 to 1909.

Year.	Gunpowder.			Dynamite and other nitro-compound blasting explosives.			Ammunition.			Fireworks.		
	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.
1905	7	6	3	10	6	19	...	...	...	15	13	26
1906	13	21	28	2	1	2	...	...	...	11	4	14
1907	11	18	20	4	...	6	3	...	4	19	12	20
1908	19	27	64	4	1	4	1	...	1	22	26	23
1909	15	19	26	4	1	5	2	...	2	19	21	41
Total .	65	91	141	24	9	36	6	...	7	86	76	124
Average .	13	18	28	5	2	7	1	...	1	17	15	25

Year.	Petroleum.			Chemicals.			Miscellaneous.		
	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.
1905	12	7	13	...	...	...	...	...	...
1906	10	9	3	...	...	...	3	1	1
1907	15	9	8	...	...	...	6	7	2
1908	41	37	6	6	...	6	5	2	8
1909	23	17	25	3	6	6	5	4	13
Total .	101	79	55	9	6	12	19	14	24
Average .	20	16	11	2	1	2	4	3	5

APPENDIX E.

Comparative statement showing the number of accidents and persons killed and injured during the five years 1905 to 1909.

—	ACCIDENTS CAUSING LOSS OF LIFE OR BODILY INJURY.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons.			
		Killed.	Injured.		
1905	40	32	61	4	44
1906	34	36	48	5	39
1907	50	46	60	8	58
1908	75	93	112	23	98
1909	70	68	118	1	71
Total	269	275	399	41	310
Average	54	55	80	8	62

APPENDIX F.

Comparative statement showing the imports of explosives by sea into British India, from other countries, during the five years 1904 to 1908.

—	1904.	1905.	1906.	1907.	1908.
Gunpowder, black . . . . . lbs.	473,925	202,751	168,353	170,299	256,753
„ smokeless . . . . „	48,246	45,125½	39,745	29,317	37,615
Ammonal . . . . . „	...	...	...	...	250
Dynamite . . . . . „	1,49,968	249,968	352,207	262,495	350,474
Blasting Gelatine . . . . . „	895,040	558,200	906,400	1,085,050	726,796
Gelignite or Gelatine Dynamite . . „	55,048	123,048	132,594	175,040	165,208
Monobel Powder . . . . . „	...	...	2,000	...	...
Other nitro-compound explosives . . „	130,811	109,475	72,921	89,256	77,616
Detonators . . . . . No.	3,020,000	1,797,000	5,536,000	3,052,400	3,062,000
Fireworks . . . . . lbs.	2,264,162	1,661,229	2,410,388	2,446,428	1,504,896
TOTAL lbs. .	4,017,200	2,949,796½	4,084,608	4,257,885	3,119,608
TOTAL No. .	3,020,000	1,797,000	5,536,000	3,052,400	3,062,000

APPENDIX G.

Statement showing the quantity of petroleum imported by sea into British India during the years 1905 to 1909.

Non-Dangerous Petroleum.

—	1905.	1906.	1907.	1908.	1909.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Chittagong	3,970,269	1,822,051	5,547,944	6,308,806	8,825,895
Balasore	10,000	26,200	...	...	...
Chandbali	367,500	405,000	270,200	206,150	208,200
Calcutta	27,144,014	20,342,078	27,342,923	33,379,196	26,599,239
Bombay	22,099,928	17,402,913	22,439,071	24,750,034	24,955,563
Sind	5,157,947	5,007,932	7,171,933	10,448,574	9,719,214
Madras	9,765,384	6,956,459	8,942,869	13,018,601	13,720,767
Burma	1,595,209	1,156,179	1,828,973	2,514,834	1,119,719
TOTAL	70,110,251	53,118,812	73,543,913	90,626,195	85,148,597

Dangerous Petroleum.

—	1905.	1906.	1907.	1908.	1909.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Calcutta	14,500	...	12,270	20,048	42,965
Bombay	66,017	184,243	92,258	110,390	84,793
Sind	622	9,795	2,733	25,801	1,844
Madras	7,828	88,104	25,400	53,756	15,280
Burma	...	...	...	...	55
TOTAL	88,972	232,142	132,661	209,995	144,937

Statement showing the quantity of petroleum produced in Burma and transported into British India during the year 1909

Dangerous.	Non-dangerous.
Gallons.	Gallons.
648,878	83,299,134

Statement showing the quantity of petroleum produced in Assam and Burma during the years 1905 to 1909.

Non-Dangerous Petroleum.

—	1905.	1906.	1907.	1908.	1909.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Assam	1,543,212	1,890,942	1,975,094	2,016,978	2,144,093
Burma	67,062,170	95,848,500	75,397,762	78,044,435	134,080,703
TOTAL .	68,605,382	97,739,442	77,372,856	80,061,413	136,224,796

Dangerous Petroleum.

—	1905.	1906.	1907.	1908.	1909.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Assam	21,014	21,855	48,017	67,256	36,588
Burma	11,988,220	11,670,200	15,043,700	18,055,500	18,479,394
TOTAL .	12,009,234	11,692,055	15,091,717	18,122,756	18,515,982

APPENDIX H.

Copy of Report made by the Chief Inspector of Explosives, India, to the Government of Burma, regarding the fire on board the S. S. "Kashmir" on the 13th January 1910.

* * * * *

"Astatki" tests applied. Its nature and constitution.

2. On the 20th of January I went to the Syriam Refinery of the Burma Oil Company, and there in front of me, the Chemist of the Burma Oil Company carried out tests with "Astatki" of a similar nature to that which is supplied to the Irrawaddy Flotilla Company for their steamers and taken from one of the Burma Oil Company's "Astatki" storage tanks. This "Astatki" flashed at 395°F., under Abel's closed test. I then had some of the "Astatki" placed in an open metal cup and heated by a Bunsen burner, and it was not till the temperature reached 480° F., as indicated by a thermometer placed in the cup, that the vapour could be permanently ignited, that is, it would continue burning. This is what is called the "Fire-test." This shows clearly that it would be imposible to set "Astatki" on fire under any ordinary circumstances. The Irrawaddy Flotilla Company's Fleet Engineer tells me they have been using "Astatki" for the last seven years without any accident with it. If the Irrawaddy Flotilla Company have on any of their oil vessels "Astatki" of the same lot as that used on the "Kashmir," it should be tested. I think it will perhaps be advisable here to give some description of "Astatki." "Astatki" is the residue left from crude petroleum after all the volatile constituents have been distilled off. It is a dark brown solid, and it has to be heated to about 120°F., before it becomes fluid. The Burma Oil Company's" Astatki," when analysed by Sir Boverton Redwood, the petroleum specialist in England, was found to be composed of as follows, *viz.* —

Carbon	86·40
Hydrogen	12·10
Sulphur	·10
Oxygen	1·40
	100·00

Its initial boiling point was 644°F.

Inspection and appearance of "Kashmir."

3. I arrived at Dedaye at about 3 P.M. on the 21st January, where I was met by Colonel F. D. Maxwell, C.I.E., Commissioner, Irrawaddy Division; Major F. R. Nethersole, Deputy Commissioner, Pyapon; Mr. A. C. Bateman, Superintendent of Police, Pyapon; Captain T. Scott Robertson, Marine Superintendent, Irrawaddy Flotilla Company; and Mr. James Wilson, Chief Engineer, "The Kashmir;" and I proceeded with them to the wreck of the "Kashmir," which had been beached. At the time of my visit the stokehold was full of water. The plan of the vessel was on board, and the details of the construction of the vessel and of the "Astatki" plant were fully explained to me. The Deputy Commissioner, who had already held a preliminary enquiry, let me see the evidence, and I was given a general narrative of events by Mr. Wilson. The vessel, when I saw it, was of course a completely gutted wreck. All the top deck and everything that could be burnt was gone, and everywhere there were signs of the intense heat to which the hull had been subjected. Some of the metal work, also pipes, packets of nails, soda water bottles were fused and twisted out of shape and there were a number of biscuits, which had presumably been in tins originally, lying about the deck, completely carbonised. There was a considerable amount of débris lying about, evidently caused by the top deck falling down.

Arrangements for "Astatki" plant.

4. The "Kashmir" had six astatki storage tanks, each of a capacity of 20 tons, placed fore and aft at a considerable distance from the stokehold and separated by bulkheads. The tanks were fitted and closed with iron lids, not fastened

down. There were also two service tanks capable of containing 5 tons each. The latter tanks were on the main deck above the boiler, and one of them is always in use for feeding the furnace. The main deck is a steel deck. The service tanks can be filled up at any time, as required, from any one of the storage tanks by pumping arrangements, the astatki having first been made fluid in the storage tanks by means of a steam pipe. The "Kashmir" was built to use either coal or oil fuel. To use astatki, the coal fire-bars are covered with fire-bricks and sealed with fire-clay to prevent any oil trickling into the coal ash-pits. The top of the fire-clay is covered with broken fire-bricks. At each furnace there is one nozzle-shaped burner with two pipes leading into it, one pipe connected with the service tank and supplying fluid astatki, the other pipe supplying steam pressure for pulverising the fuel. There is a valve actuated by a spanner near the service tanks for cutting off the astatki supply and a wheel valve on the burner for controlling the supply, *i.e.*, for increasing or reducing it as required. The steam pressure can also be controlled by another valve.

The effect of the steam pressure, if sufficient, is to force out the astatki in the form of a very finely divided spray. This spray at the commencement is lighted by a torch and the ignited spray is impinged on a "baffle" or heap of broken bricks on the furnace bed, and this causes the flame to spread round the furnace. The "Kashmir" is one of the two vessels belonging to the Irrawaddy Flotilla Company, burning oil fuel, which has an open stokehold; the others have their stokeholds covered in with metal work. About ten feet from the burners there was a wooden screen above the iron bulkhead to prevent dust from getting to the engines. Round the opening of the stokehold on the level of the main deck there were iron railings, presumably to prevent people from falling into the stokehold. Round these railings and between the lower and upper decks, canvas purdahs about 8 or 9 feet high had been placed to prevent foreign matter from being blown into the stokehold.

Narrative account of disaster.

5. The "Kashmir" arrived at Dedaye on the evening of the 13th January about 7-30 P.M., and went alongside the station flat to discharge passengers and cargo. She then, about 8 P.M., went out to midstream and dropped anchor for the night, and it was while the vessel was taking the strain on her anchor that the fire took place. The vessel was under reduced firing, the day's work being practically finished, and the Chief Engineer, who had been in the stokehold practically the whole day from 5-30 A.M., had just left the stokehold about 4 or 5 minutes when he heard a cry of "fire". Before he left he states that everything was in order, the boiler steam gauge was at 120 lbs. per square inch, and the oil supply and steam valves were set with reduced openings to maintain the steam at reduced pressure.

On hearing the cry of "fire", the Chief Engineer ran to get a spanner so as to cut off the feed from the service tank. By the time he got the spanner, the whole stokehold was ablaze, and there were volumes of black smoke, and he could not get to the service tanks. All dependable witnesses agree that there was a sheet of flame from the stokehold, and the whole ship became ablaze, the flames being fanned by a high wind, and there was nothing left to be done but to abandon the ship; some of the people got off in the flats which were being towed alongside the steamer, and others jumped into the water and were picked up. There is no doubt that some lives were lost.

About 7 hours later the Captain of the "Kashmir", who was anxious to try and do something to save the ship, returned with a creek steamer, the "Kelso", and played a hose on the "Kashmir". This was of course an unwise proceeding, as when the tanks of astatki became subjected to the intense heat of the flames, the astatki was bound to become vapourised, and there was every probability of the vapour pressure forcing up the lids and liberating the vapour which would shoot out and catch fire at once. This appears to have actually happened, as suddenly a sheet of flame shot out from the vicinity of the forward astatki storage tank and enveloped the "Kelso's upper structure, setting her on fire, and a number of lives were lost by burning on this boat, and some were drowned who had jumped into the water. The fire, however, on the "Kelso" was ultimately put out. As far as I could judge, there were no signs of any real explosion on board the "Kashmir".

Conclusion as to cause of accident.

6. From the evidence it would appear that there were 2 firemen on watch in the stokehold. One man was examined in front of me and must have seen what occurred, but his evidence was contradictory and unsatisfactory. It appeared to me that he was trying to hide something, and I am sure he was lying freely. The other fireman I did not see, but the Deputy Commissioner told me he was a stupid-looking youth of 22 with very little experience, and his pay was only R22 per mensem. This man tried to make out in his evidence that the fire started in the purdah screen. I feel convinced that some act of one of these 2 firemen must have caused the accident and, if they chose, they could give information as to the cause. In the absence of direct evidence, I am of opinion that the most probable way in which the accident could have been caused is the following: The flame on the burner may have gone out, as it sometimes does when only a small quantity of fuel is passing through the burner. If this presumption is correct, the fireman's duty was to turn the wheel valve and shut off the oil supply at once until he was ready to ignite the oil again at the burner with a torch. In the present case, I think he must have by mistake turned the wheel the wrong way and put on the full possible supply of oil instead of shutting it off. This would mean that the fluid astatki would drop on to the red hot furnace floor gradually getting partially vapourised and would necessarily flow into the stokehold. The fireman on coming back with the lighted torch to set fire to the burner must have ignited the vapour before reaching the burner. He then cried "fire" and bolted. The vapour, when ignited, would cause a flash and set the astatki on fire, and the astatki would then burn freely with dense black smoke, and the fire was fed the whole time by fresh supply from the burner. There were about 3 tons of astatki in the service tank at the time of the fire. The canvas purdahs round the railings acted as a sort of funnel to the flames and caught fire themselves and helped to communicate the flames to the upper wood deck.

Recommendations.

7. I would make the following recommendations to prevent similar accidents in future.

(1) It is absolutely necessary that only experienced and reliable firemen be employed in charge of the valves for regulating the oil and steam supply. If practicable, they should be certificated men. The men who, in my opinion, are responsible for the present disaster seem to me to have been very little better than ordinary coolies, and this was the initial cause of the disaster.

(2) The stokehold should not be an open one, but should have an iron roof. If the stokehold in the "Kashmir" had been a closed one it is possible that the ship might have been saved as the flames would not have mounted up, and the Chief Engineer would have been able to get to the service tanks to cut off the supply of "astatki".

(3) There should be no wood-work, such as the wood screen previously referred to, or any other inflammable material in the stokehold.

(4 There should be two valves outside the stokehold for shutting off the feed of astatki from the service tanks, one fixed in the neighbourhood of the service tanks, and the other to be manipulated from the engine room.

(5) If spanners are necessary for closing and opening valves, they should be fixtures on the valves.

(6) If practicable, there might be some arrangements actuated by a lever outside the stokehold for allowing a quantity of sand to fall from the roof on any fire ignited below. The sand might be contained either in a metal carrier which could be tipped up or in a receptacle with false bottom, which could be opened.

APPENDIX I.

DEPARTMENT OF EXPLOSIVES.

NOTIFICATION.

Dated Calcutta, the 3rd March 1910.

No. 385.—With reference to Notification No. 4555—4, dated the 31st May 1907, of the Government of India, Department of Commerce and Industry, publishing rules to regulate the transport and importation of explosives, the following list of "authorized explosives" referred to in rule 9 (1) of the above rules is published for general information :—

LIST OF AUTHORIZED EXPLOSIVES.

The following explosives are at present authorized for importation into British India, for general sale :—

Class 1.—GUNPOWDER.

GUNPOWDER.

Class 2.—NITRATE MIXTURE.

AMMONAL.

CHILWORTH SPECIAL POWDER.

Class 3.—NITRO-COMPOUND.

Every explosive in this class and every explosive ingredient thereof shall be so thoroughly purified and otherwise of such character as to satisfy a test known as the heat test, and specified in the rule for testing explosives, published with Notification, No. 4555—4, dated the 31st May 1907, referred to above.

Division 1.

BALLISTITE.
BLASTING GELATINE.
CARBONITE.
CELTITE.
CORDITE.
CORDITE, M. D.
DYNAMITE.
GELATINE DYNAMITE, No. 1.
GELATINE DYNAMITE No. 2 OR GELIGNITE.
MONOBEL POWDER.
PHŒNIX POWDER.

Provided that every explosive in this division shall be of such character and consistency as not to be liable to liquefaction or exudation.

Division 2.

AMBERITE, No. 2.
E. C. SPORTING POWDER.
EMPIRE POWDER.
GUNCOTTON.
IMPERIAL SCHULTZE GUNPOWDER.
NEGRO POWDER.
PICRIC ACID.

PICRIC POWDER.
ROBURITE.
SMOKELESS DIAMOND.
TONITE OR COTTON POWDER.

Class 4.—CHLORATE MIXTURE.

Nil.

Class 5.—FULMINATE.

Nil.

Class 6.—AMMUNITION.

Division 1.

PERCUSSION CAPS.
RAILWAY FOG SIGNALS.
SAFETY CARTRIDGES.
SAFETY FUZES FOR BLASTING.
SAFETY ELECTRIC FUZES.

Division 2.

CARTRIDGES FOR CANNON, SHELLS, MINES, BLASTING OR OTHER LIKE PURPOSES.
CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.
ELECTRIC FUZES.
FUZES FOR SHELLS.
TUBES FOR FIRING EXPLOSIVES.
WAR ROCKETS.

Division 3.

CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.
DETONATORS.
ELECTRIC DETONATORS.
FRICTION TUBES.
FUZES FOR SHELLS.
TUBES FOR FIRING EXPLOSIVES.

Class 7.—FIREWORK.

Division 1.

Nil.

Division 2.—Manufactured Fireworks.

MANUFACTURED FIREWORKS.
ALUMINIUM TORCHES.
AMORCES.
CHINESE CRACKERS.
ELECTRIC SPARKLERS.
LIGHT SIGNALS.
MAGNESIUM TORCHES.
PYROTECHNIC MATCHES.

C. A. MUSPRATT-WILLIAMS, *Lieut.-Col., R.A.,*
Chief Inspector of Explosives in India.

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Indian Explosives Act (IV of 1884)

Indian Petroleum Act (VIII of 1899)

THIRTEENTH ANNUAL REPORT

OF THE

CHIEF INSPECTOR OF EXPLOSIVES IN INDIA

BEING HIS

Annual Report for the Year ending 31st March 1912

CALCUTTA
SUPERINTENDENT GOVERNMENT PRINTING, INDIA
1912

Price twelve annas or 1 shilling.

Thirteenth Annual Report of the Chief Inspector of Explosives, India.

No. 888.

FROM

CAPTAIN J. F. TYRRELL, R.A.,
Offg. Chief Inspector of Explosives in India,

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,
Department of Commerce and Industry.

Simla, the 11th June 1912.

SIR,

I have the honour to submit herewith a Report of the work of my Department during the year ending 31st March 1912.

Number of magazines.

2. During the year 1911, 158 licenses (ten more than in the previous year) were granted in British India under Rule 17 of the rules to regulate the manufacture, possession and sale of explosives. The number of magazines licensed was 217 or 15 more than in 1910, and is in excess of the number of licenses granted, because in a number of cases firms have two or more magazines in one place under one license. A statement showing the number and location of the magazines and also the number of licenses granted in British India during the year 1911 is given in Appendix A, and a statement showing the number of magazines and licenses granted during the past ten years is shown in Appendix B.

Inspection of explosives magazines during the year.

3. During the year, 376 inspections of magazines were made; a number of magazines being inspected two or three times. Those magazines are inspected most frequently which are situated in the neighbourhood of towns or in populous localities, or which contain large quantities of explosives, or any explosive, which on account of its greater susceptibility to decomposition and consequent ignition, it is considered advisable to examine and test more frequently than other explosives. The Roburite Factory at Karachi was also inspected.

Condition of magazines.

4. The magazines generally are in good order, and, as usual, magazine owners have been found most willing to carry out recommendations even when involving considerable expense, and my thanks are due to them for making my duties easy in this respect.

Condition of explosives in magazines.

5. The physical condition of all explosives in the different magazines during the year was found to be good with the exception of the following explosives which were found to have deteriorated or to have become defective, and were destroyed :—

(*a*) 135 lbs. Roburite from Messrs. Gladstone, Wyllie and Company's magazine at Bhagitand.

(*b*) 45 lbs. Monobel powder from Messrs. Gillanders Arbuthnot and Company's magazine at Giridhi.

(*c*) 79 Electric Detonators from the New Beerbhum Coal Company's magazine at Belrooi.

(*d*) 348 Electric Detonators from the New Beerbhum Coal Company's magazine at Boria.

(*e*) 12 Flares from the Calcutta Port Commissioners' magazine at Moyapur.

(*f*) 20 lbs. Monobel powder and 1 lb. Amberite from Messrs. Elahi Bux and Company's magazine at Meerut.

(*g*) 15 lbs. Monobel Powder from Messrs. Ewart Latham and Company's magazine at Bombay.

(*h*) 6,942 electrically defective Detonators from Messrs. Gillanders Arbuthnot and Company's magazine at Bhagotdih.

(*i*) 3,541 electrically defective Detonators from Messrs. Gillanders Arbuthnot and Company's magazine at Choitodih.

(*j*) 1,800 electrically defective Detonators from Messrs. Gillanders Arbuthnot and Company's magazine at Barakar.

(*k*) 301 lbs. Monobel Powder from the Shivrajpur Syndicate's magazine at Shivrajpur.

(*l*) 667 lbs. Carbonite from the Bengal Coal Company's magazine at Sitalpur.

(*m*) 70 electrically defective Detonators from Messrs. Shaw Wallace and Company's magazine at Gondhoodi.

(*n*) 250 lbs. Smokeless Diamond Powder from the Bombay Port Trust magazine at Sewree.

(*o*) 10 lbs. Gelignite and 11 lbs. Blasting Gelatine from Messrs. Best and Company's magazine at Dharwar.

(*p*) 158 Coils Safety Fuse and 11 Detonators from the Lutchipore Coal Company's magazine at Panchgachia.

(*q*) 5 lbs. Monobel Powder from the Chota Nagpur Mica Syndicate's magazine at Koderma.

Thefts from magazines.

6. During the year under report two thefts of explosives were reported to this office.

(*a*) The Commissioner in Sind reported that on the 11th May 1911 a complaint of theft was made to the police by a boatman at Sukkur, in the investigation of which the police searched the boat of the complainant and found two full boxes of Detonators. On enquiry it was found that the Detonators in question were stolen from the Public Works Department, in regard to which the Chief Engineer in Sind took departmental action, and the complainant was tried and convicted and sentenced to one month's imprisonment.

(*b*) 690 lbs. Gelignite and 290 lbs. Dynamite were stolen from Messrs. Millie and McLeish's magazine at Coonoor on January 29th, 1912. The case is still under enquiry by the local authorities.

Import of explosives.

7. Two thousand six hundred and eight tons of explosives were imported into British India during the year 1911, the value being Rs. 21,90,819. Full details showing the different kinds of explosives imported and the value of each are given in Appendix C. From this Appendix it will be seen that though the value of Fireworks imported into Bengal is given, the quantity imported is not shown, as the Collector of Customs states that the quantity imported is not recorded in his office. A comparative statement showing the quantity of explosives imported during the last 10 years is given in Appendix D.

8. A list of explosives at present authorized for importation into British India for general sale has been published in the *Gazette of India* for information. This list will be found in Appendix E.

Authorized explosives.

9. The following amendments were made to the rules under the Indian Explosives Act, 1884 (IV of 1884), during the year.

Explosives Rules.

(*a*) An addition has been made to Rule 36 of the rules for the manufacture, possession and sale of explosives and Rule 31 of the rules for the transport and importation of explosives whereby a license shall be liable to be forfeited by a Local Government if the continuance of the same in the hands of the licensee is deemed objectionable.

(*b*) Clause (2) of Condition 2 of Form F of the rules for the manufacture, possession and sale of explosives has been cancelled and new clauses (2) and (3) have been inserted laying down more stringent conditions regarding doors and windows of licensed premises.

(*c*) An addition has been made to Condition 6 of Form J of the above rules whereby certificates of test of lightning conductors must be hung up in magazines.

(*d*) The rules regarding acetylene, when an explosive and when not, have been amended.

(*e*) Rules for the importation, transport, manufacture, possession and sale of explosives in the territory of Mourbhanj State were issued during the year.

Petroleum.

10. During the year under report 583 licenses for the storage of non-dangerous petroleum regarding which this Department was concerned or consulted, were granted. This is an increase of 43 as compared with last year. A list of these installations, corrected up to 31st December 1911 and showing the districts in which they are located is given in Appendix F, and a statement showing the number of licenses granted during the past seven years is given in Appendix G. In addition to the number of licenses shown in Appendix F there are of course a very large number of storage godowns for the possession of non-dangerous petroleum in non-bulk, licensed by District officers, of which this Department has no cognizance.

Number of petroleum installations.

11. There are also a number of godowns licensed for the storage of dangerous petroleum in non-bulk throughout the country, and the Inspectors of Explosives and I have inspected some of these, when their existence has been brought to our notice, or where they are near non-dangerous petroleum installations or contain more than 500 gallons of petrol.

Dangerous petroleum godowns.

12. During the year the Chief Inspector of Explosives personally visited the large bulk oil installations at Madras, Bombay, Karachi, Calcutta (Budge Budge and Narculdanga), Chittagong and Rangoon and also the oil-fields of Burma and Assam. He in addition inspected a number of minor installations. In all 682 inspections of non-dangerous petroleum premises were made. One hundred and thirteen dangerous petroleum godowns were also inspected by this Department.

Inspection of petroleum installations during the year.

13. The large petroleum installations are usually under efficient European supervision and are in good order and well looked after.

Condition of major installations.

14. The small or minor petroleum installations are installations in which not more than 50,000 gallons of kerosine oil in combined bulk and non-bulk are stored, and are looked after by native Agents, employed by the large oil firms.

Condition of minor installations.

The oil for these installations is supplied from the major installations at the different ports, and the retail trade is carried out in them. A great deal of inspection of these minor installations has been done by this Department during the last six years with the result that their condition is very much improved, and the generality of them are in very good order. As a matter of fact when an installation is found not up to the mark at an inspection, it is usually due to the fact that some new Agent has been recently appointed who has not realised what is required of him. The Oil Companies do not hesitate to change their Agents if several unsatisfactory reports are made of the installations under their charge.

Import of petroleum.

15. During the year 1911, 88,967,450 gallons of non-dangerous petroleum and 196,233 gallons of dangerous petroleum were imported by sea into British India. The details are given in Appendix H and also the quantity of non-dangerous and dangerous petroleum produced in Assam and Burma during the year, as well as during the past seven years.

Petroleum Rules.

16. Of amendments to the Petroleum Act Rules, or of questions under consideration in connection with them during the year, the following are the most important:—

(*a*) Part III of the Indian Petroleum Act, 1899 (VIII of 1899), has been amended so as to provide for the testing of liquid mixtures as well as viscous and sedimentary mixtures.

(*b*) A new Rule 8-A in Chapter IV of Part II of the Petroleum Rules was sanctioned for the possession of any stated quantity of dangerous petroleum in installations.

(*c*) Rule 5 of Part III of the rules was amended so as to provide that no samples need be taken in the case of petroleum declared to be dangerous.

(*d*) As the rules do not permit the issue of a transport license to cover a consignment of dangerous petroleum in bulk sent from one British Indian port to another, steps have been taken to ~~include~~ exempt such petroleum from the operation of any notification issued under section 3(2) (*a*) of the Petroleum Act declaring that petroleum imported into any port in British India from any other Port in British India, shall for the purposes of the Act, be deemed to be transported.

Accidents.

Number of accidents.

17. One accident occurred during the year under report in the magazines licensed in British India, when the Bombay Port Trust floating magazine was blown up on 12th March 1912. In this accident ten men lost their lives. A full account will be found in Appendix I. A list of accidents, with a short account of each, that have occurred with explosives, inflammable substances, dangerous goods, etc., between the 1st January and 31st December 1911 and that have been reported to this Department is given in Appendix J. It will be seen from a perusal of the details that the accidents have practically all been caused by gross neglect of ordinary precautions. In all there were 68 accidents causing 352 deaths and injuries to 124 persons. Comparative statements given in Appendices K and L show the total number of accidents and the number of persons killed or injured by them during the last six years. As stated in previous reports it is very doubtful whether all accidents that occur are duly reported to this Department and, therefore, it is very possible that the statistics given are underestimated. I notice that in some parts of India accidents appear more prevalent than in others, but I am inclined to think that such difference may be occasioned by the local authorities in some places being more careful in carrying out instructions to report accidents than they are in others.

18. There were nine accidents from Gunpowder during the year, causing fourteen deaths and injuries to eight persons.

Gunpowder, Class I.

19. Nitro-Compounds were responsible for four accidents from which four persons were killed and 29 injured. One accident, item No. 13 of Appendix J, by which three persons lost their lives and 26 were injured was made the subject of a special report, which will be found in Appendix M.

Nitro-Compounds, Class III.

20. Seventeen accidents from fireworks caused the death of thirteen persons and injuries to 24 others. It will be noticed from the details of the accidents that a number of these were caused by Sulphur Chlorate mixtures, the use of which is now prohibited, and as stated in my last report if this prohibition is strictly enforced, there is no doubt the number of accidents from fireworks will be considerably reduced.

Fireworks, Class VII.

21. There were 30 accidents from petroleum during the year which were responsible for 21 deaths and injuries to 35 persons. It will be seen from a perusal of the accidents in Appendix J that carelessness is a prominent feature in most of them. In India the petroleum accidents are caused usually by lights being brought into proximity to oil vapour, to kerosine lamps being upset or falling down and to kerosine being poured on to fires or into lighted lamps.

Petroleum.

22. There were two accidents from chemicals reported during the year causing the death of one person and injuries to another.

Chemicals.

23. Six accidents from miscellaneous dangerous articles and substances were responsible for 299 deaths and injuries to 27 persons. One accident alone, item 63 in Appendix J, due to mishandling of an imitation Kitson lamp, was responsible for 297 deaths and injuries to 20 persons.

Miscellaneous accidents.

24. Only one accident was reported to this Department whereby one person was killed and another injured at the Quetta Arsenal by the flame of a brazing lamp igniting oil vapour from a tin of oil lying close to the lamp.

Government accidents.

25. The number of inspections done by this Department during the year is again a record one, *viz.*, 1,171 against 1,157 done the previous year. To give some idea of the work and the ground covered, I give the following details.

During the 12 months, 1st April 1911 to March 1912, the Chief Inspector of Explosives was away from Head Quarters on inspection duty for 162 days and travelled 21,544 miles, the two inspectors were away for 257 days and 224 days and travelled 29,358 and 21,388 miles respectively. In conclusion I owe my grateful thanks to my Inspectors for the able assistance they have given me, and I cannot speak too highly of their services. In addition to their ordinary work they have been frequently called away in the middle of inspections to examine suspicious packages and to give evidence in Court in connection with outrages.

I have the honour to be,

SIR,

Your most obedient Servant,

J. F. TYRRELL, *Captain, R.A.,*

Offg. Chief Inspector of Explosives in India.

APPENDIX A.

List of Magazines and Licenses granted under Rule 17 of the Explosives Rules for the year 1911.

Presidency or Province.	District.	Magazines.			Licenses.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Bengal	Burdwan	21	...	21	18	...	18
	Darjeeling	3	...	3	3	...	3
	Gaya	3	...	3	3	...	3
	Hazaribagh	15	...	15	12	...	12
	Hooghly	4	...	4	1	...	1
	Howrah	1	...	1	1	...	1
	Manbhum	20	...	20	17	...	17
	24-Parganas	2	...	2	1	...	1
	Sambalpur	1	...	1	1	...	1
	Singbhum	4	...	4	2	...	2
	TOTAL	74	...	74	59	...	59
Bombay	Ahmedabad	4	...	4	4	...	4
	Bombay	21	...	21	13	...	13
	Dharwar	2	...	2	1	...	1
	Karachi*	5	...	5	3	...	3
	Kolaba	3	...	3	3	...	3
	Panch Mahals	1	...	1	1	..	1
	Poona	...	4	4	...	2	2
	Thana	1	...	1	1	...	1
	TOTAL	37	4	41	26	2	28
Burma	Hanthawaddy	4	...	4	3	...	3
	Mandalay	...	2	2	...	1	1
	Mergui	1	...	1	1	...	1
	Myitkyna	...	2	2	...	1	1
	Pegu	...	1	1	...	1	1
	Ruby Mines	1	...	1	1	...	1
	Tavoy	...	4	4	...	3	3
	TOTAL	6	9	15	5	6	11

* At Karachi there is in addition a Roburite Factory licensed under Rule 15.

Presidency or Province.	District.	Magazines.			Licenses.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Central Provinces	Balaghat	1	...	1	1	...	1
	Betul	2	...	2	1	...	1
	Bhandara	1	1	2	1	1	2
	Bilaspur	1	...	1	1	...	1
	Chhindwara	3	5	8	3	3	6
	Jubbulpur	2	...	2	1	...	1
	Nagpur	4	...	4	4	...	4
	Narsingpur	2	...	2	1	...	1
	Raipur	3	...	3	4	...	4
	Total	19	6	25	17	4	21
Eastern Bengal and Assam.	Cachar	2	...	2	1	...	1
	Lakhimpur	1	...	1	1	...	1
	Total	3	...	3	2	...	2
Madras	Anantapur	4	...	4	2	...	2
	Chingleput	2	...	2	2	...	2
	Kistna	1	...	1	1	...	1
	Madras	19	2	21	5	1	6
	Madura	...	1	1	...	1	1
	Nellore	6	...	6	3	...	3
	The Nilgiris	2	...	2	1	...	1
	North Arcot	...	1	1	...	1	1
	South Arcot	...	1	1	...	1	1
	Tanjore	4	...	4	4	...	4
	Trichinopoly	2	3	5	2	3	5
	Vizagapatam	6	...	6	3	...	3
	Total	46	8	54	23	7	30
Punjab	Rawal Pindi	1	...	1	1	...	1
	Total	1	...	1	1	...	1

Presidency or Province.	District.	Magazines.			Licenses.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
United Provinces	Gharwal . . .	1	...	1	1	...	1
	Lucknow . . .	1	...	1	1	...	1
	Meerut . . .	1	...	1	3	...	3
	Shahjahanpur . .	1	...	1	1	...	1
	TOTAL .	4	...	4	6	...	6
SUMMARY.							
Bengal		74	...	74	59	...	59
Bombay		37	4	41	26	2	28
Burma		6	9	15	5	6	11
Central Provinces		19	6	25	17	4	21
Eastern Bengal and Assam		3	...	3	2	...	2
Madras		46	8	54	23	7	30
Punjab		1	...	1	1	...	1
United Provinces		4	...	4	6	...	6
TOTAL .		190	27	217	139	19	158

APPENDIX B.

Summary of Magazines and Licenses granted under Rule 17 for the ten years ending 1911.

	Magazines.			Licenses.		
	Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
1902	121	26	147	85	19	104
1903	129	17	146	87	14	101
1904	138	12	150	96	9	105
1905	139	15	154	95	13	108
1906	150	19	169	105	15	120
1907	164	9	173	118	8	126
1908	167	19	186	119	15	134
1909	178	29	207	128	21	149
1910	189	13	202	135	13	148
1911	190	27	217	139	19	158

APPENDIX C.

Statement showing the imports of explosives by sea into British India from other countries in the year 1911.

	Bengal.	Bombay.	Sind.	Madras.	Burma.	Eastern Bengal and Assam.	TOTAL.
Quantity.							
Gunpowder, black . . . . lbs.	33,210	119,249	37,500	12,535	26,575	...	229,069
„ smokeless . . . . „	6,900	6,671	14,035	1,655	350	...	29,611
Ammonal . . . . . „	...	...	...	7,800	...	...	7,800
Dynamite . . . . . „	75,264	95,000	...	176,813	42,500	...	389,577
Blasting gelatine . . . . . „	21,392	5,000	...	713,850	10,000	...	750,242
Gelignite or gelatine dynamite . . „	17,584	160,000	6,000	21,040	21,410	...	226,034
Monobel powder . . . . . „	...	...	...	...	...	...	...
Other nitro-compound explosives . . „	43,456	...	...	...	...	...	43,456
Detonators . . . . . No.	10,589	260,000	12,000	2,541,000	393,200	...	3,216,789
Fireworks . . . . . lbs.	...	3,096,884	62,139	118,342	263,460	...	3,540,825
TOTAL . „	197,806	3,482,804	119,674	1,052,035	364,295	...	5,216,614
TOTAL . No.	10,589	260,000	12,000	2,541,000	393,200	...	3,216,789
Value in rupees.							
Gunpowder, black	31,961	51,174	19,939	7,140	11,792	...	1,22,006
„ smokeless	20,120	10,590	20,840	5,285	1,332	...	58,167
Ammonal	...	...	...	3,300	...	...	3,300
Dynamite	53,147	75,212	...	1,48,919	32,798	...	3,10,076
Blasting gelatine	16,257	4,715	...	6,40,441	7,117	...	6,68,530
Gelignite or gelatine dynamite . . .	12,335	1,28,159	3,180	15,799	18,842	...	1,78,315
Monobel powder	...	...	...	...	...	...	...
Other nitro-compound explosives . . .	26,074	...	...	...	...	...	26,074
Detonators	6,820	4,965	330	46,745	6,113	...	64,973
Fireworks	55,131	5,57,009	25,207	33,456	88,575	...	7,59,378
TOTAL .	2,21,845	8,31,824	69,496	9,01,085	1,66,569	...	21,90,819

APPENDIX D.

Comparative statement showing the imports of explosives by sea into British India from other countries for the ten years ending 1911.

	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.
Gunpowder, black . lbs.	211,035	272,423	473,925	202,751	168,353	170,299	256,753	213,854	242,702	239,069
„ smokeless „	26,605	31,004	48,246	45,125½	39,745	29,317	37,615	39,412	38,176	29,611
Ammonal . . . „	...	...	...	...	...	...	250	...	...	7,800
Dynamite . . . „	189,896	416,480	149,968	249,968	352,207	262,495	350,474	453,016	360,636	389,577
Blasting gelatine . „	725,000	843,432	895,040	558,200	906,400	1,085,050	726,796	805,080	676,458	750,242
Gelignite or gelatine dynamite. „	50,000	22,096	55,048	123,048	132,594	175,040	165,208	132,032	178,968	226,034
Monobel powder . „	...	...	...	...	2,000	...	...	...	...	...
Other nitro-compound explosives. „	107,071	222,104	130,811	109,475	72,921	89,256	77,616	48,016	96,736	43,456
Detonators . . No.	3,297,509	4,388,400	3,020,000	1,797,000	5,536,000	3,052,400	3,062,000	5,206,275	2,687,556	3,216,789
Fireworks . . . lbs.	1,147,223	1,971,317½	2,264,162	1,661,229	2,410,388	2,446,428	1,504,896	1,339,733	3,410,741	3,540,825
TOTAL . „	2,456,830	3,778,856½	4,017,200	2,949,796½	4,084,608	4,257,885	3,119,608	3,031,143	5,004,417	5,216,614
TOTAL . No.	3,297,509	4,388,400	3,020,000	1,797,000	5,536,000	3,052,400	3,062,000	5,206,275	2,687,556	3,216,789

APPENDIX E.

DEPARTMENT OF EXPLOSIVES.

NOTIFICATION.

Dated Calcutta, the 1st March 1912.

No. 408.—With reference to Notification No. 4555—4, dated the 31st May 1907, of the Government of India, Department of Commerce and Industry, publishing rules to regulate the transport and importation of explosives, the following list of "authorized explosives" referred to in rule 9 (1) of the above rules is published for general information:—

LIST OF AUTHORIZED EXPLOSIVES.

The following explosives are at present authorized for importation into British India for general sale:—

Class 1.—GUNPOWDER.

GUNPOWDER.

Class 2.—NITRATE MIXTURE.

AMMONAL.

CHILWORTH SPECIAL POWDER.

Class 3.—NITRO-COMPOUND.

Every explosive in this class and every explosive ingredient thereof shall be so thoroughly purified and otherwise of such character as to satisfy a test known as the heat test, and specified in the rule for testing explosives, published with Notification No. 4555—4, dated the 31st May 1907, referred to above.

Division 1.

ARDEER GELIGNITE.

BALLISTITE.

BLASTING GELATINE.

CARBONITE.

CELTITE.

CORDITE.

CORDITE, M. D.

DYNAMITE.

GELATINE DYNAMITE.

GELIGNITE.

MONOBEL POWDER.

PHŒNIX POWDER.

SAMSONITE.

Provided that every explosive in this division shall be of such character and consistency as not to be liable to liquefaction or exudation.

Division 2.

AMBERITE No. 2.

E. C. SPORTING POWDER.

EMPIRE POWDER.

GUNCOTTON.

IMPERIAL SCHULTZE GUNPOWDER.

NEGRO POWDER.

NOBEL'S SPECIAL POWDER.

N. S. SMOKELESS.

PICRIC ACID.

PICRIC POWDER.
RENDITE.
ROBURITE.
RUBY POWDER.
SMOKELESS DIAMOND.
TONITE OR COTTON POWDER.

Class 4.—CHLORATE MIXTURE.

Nil.

Class 5.—FULMINATE.

Nil.

Class 6.—AMMUNITION.

Division 1.

PERCUSSION CAPS.
RAILWAY FOG SIGNALS.
SAFETY CARTRIDGES.
SAFETY FUZES FOR BLASTING.
SAFETY ELECTRIC FUZES.

Division 2.

CARTRIDGES FOR CANNON, SHELLS, MINES, BLASTING OR OTHER LIKE PURPOSES.
CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.
ELECTRIC FUZES.
FILLED SHELLS.
FUZE LIGHTERS.
FUZES FOR SHELLS.
TUBES FOR FIRING EXPLOSIVES.
WAR ROCKETS.

Division 3.

CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.
DETONATORS.
ELECTRIC DETONATORS.
FRICTION TUBES.
FUZES FOR SHELLS.
QUICK FIRING AMMUNITION.
TUBES FOR FIRING EXPLOSIVES.

Class 7.—FIREWORK.

Division 1.

Nil.

Division 2.—Manufactured Fireworks.

MANUFACTURED FIREWORKS.
ALUMINIUM TORCHES.
AMORCES.
CHINESE CRACKERS.
ELECTRIC SPARKLERS.
MAGNESIUM TORCHES.
PYROTECHNIC MATCHES.
ROCKETS.
SIGNAL LIGHTS.

C. A. MUSPRATT-WILLIAMS, *Lieut.-Col., R.A.,*
Chief Inspector of Explosives in India.

APPENDIX F.

List of non-dangerous petroleum instal'ation licensed during the year 1911.*

Province.	District.	No.
Ajmer-Merwara	Ajmer	4
	TOTAL	4
Baluchistan	Quetta	2
	TOTAL	2
Bengal	Balasore	3
	Bankura	1
	Bhagulpur	5
	Birbhum	1
	Burdwan	7
	Calcutta	6
	Champaran	2
	Cuttack	3
	Darbhanga	3
	Darjeeling	3
	Gaya	4
	Howrah	3
	Khulna	1
	Manbhum	4
	Midnapur	2
	Monghyr	3
	Mozufferpur	4
	Murshidabad	1
	Nadia	6
	Patna	5
	Purnea	6
	Sambalpur	6
	Saran	3
	Shahabad	3
	Santhal Parganas	6
	24-Parganas	10
	TOTAL	101
Bombay	Ahmedabad	5
	Ahmednagar	3
	Belgaum	4
	Bijapur	6
	Bombay	6
Bombay—*contd.*	Broach	7
	Dharwar	12
	Hyderabad (Sind)	1
	Karachi	6
	East Khandesh	4
	West Khandesh	5
	Nasik	5
	Poona	3
	Satara	3
	Sholapur	3
	Surat	6
	Thana	4
	TOTAL	83
Burma	Hanthawaddy	7
	Magwe	11
	Mandalay	3
	Minbu	1
	Mingyin	2
	Pokoku	7
	Prome	3
	Thayetmyo	1
	TOTAL	35
Central Provinces	Akola	6
	Amraoti	8
	Bhandara	5
	Bilaspur	3
	Buldana	9
	Chanda	3
	Hoshangabad	4
	Jubbulpur	6
	Nagpur	4
	Narsingpur	3
	Nimar (Khandwa)	5
	Raipur	3

* This list includes godowns for the storage of non-dangerous petroleum regarding which this Department has cognizance.

Province.	District.	No.
Central Provinces—*contd.*	Sangor	3
	Seoni	3
	Wardha	9
	TOTAL	74
Eastern Bengal and Assam.	Backergunge	1
	Bogra	2
	Chittagong	5
	Dinajpur	3
	Jalpaiguri	2
	Kamrup	1
	Lakhimpur	2
	Pabna	3
	Rajshaye	3
	Rangpur	4
	Sylhet	2
	TOTAL	28
Hyderabad	Hyderabad	9
	Secunderabad	2
	TOTAL	11
Madras	Anantapur	4
	Bellary	4
	Chingleput	7
	Coimbatore	7
	Cuddapah	2
	Ganjam	4
	Godavery	6
	Guntur	4
	Kistna	5
	Kurnool	2
	Madras	7
	Madura	6
	Malabar	12
	Nellore	3
	North Arcot	6
	Ramnad	4
	Salem	3
	South Arcot	12
Madras—*contd.*	South Canara	1
	Tanjore	16
	Tinevelly	6
	Trichinopoly	5
	Vizagapatam	3
	Total	129
Mysore	Bangalore	10
	TOTAL	10
North-West Frontier Province.	Hazara	3
	Peshawar	3
	TOTAL	6
Punjab	Amritsar	4
	Delhi	4
	Gurdaspur	1
	Jullunder	3
	Lahore	5
	Ludhiana	3
	Multan	1
	Rawal Pindi	3
	Shahpur	1
	Sialkot	3
	Umballa	7
	TOTAL	35
United Provinces	Agra	4
	Aligarh	2
	Allahabad	4
	Azamgarh	1
	Bahraich	1
	Ballia	1
	Bara Banki	2
	Bareilly	4
	Basti	5
	Benares	4
	Cawnpur	3
	Dehra Dun	1

Province.	District.	No.	Province.	District.	No.
United Provinces—*contd.*	Etawah	3	United Provinces—*concld.*	Meerut	4
	Fyzabad	3		Moradabad	3
	Ghazipur	1		Muttra	1
	Gonda	2		Saharanpur	3
	Gorakpur	3		Shahjahanpur	3
	Jaunpur	1			
	Jhansi	3			
	Lucknow	3		TOTAL	65

SUMMARY.

Ajmer-Merwara	4
Baluchistan	2
Bengal	101
Bombay	83
Burma	35
Central Provinces	74
Eastern Bengal and Assam	28
Hyderabad	11
Madras	129
Mysore	10
North-West Frontier Province	6
Punjab	35
United Provinces	65
TOTAL	583

APPENDIX G.

Summary of non-dangerous petroleum installations and godowns licensed for the seven years ending 1911.

—	1905.	1906.	1907.	1908.	1909.	1910.	1911.
Ajmer-Merwara	3	3	3	4	4	4	4
Baluchistan	...	...	1	1	1	1	2
Bengal	67	74	74	79	89	96	101
Bombay	65	64	76	82	79	84	83
Burma	10	11	12	17	19	33	35
Central Provinces	49	49	67	66	69	71	74
Eastern Bengal and Assam	11	14	16	21	24	31	28
Hyderabad	...	...	...	...	...	2	11
Madras	49	57	89	97	95	114	129
Mysore	...	...	...	...	8	10	10
North-West Frontier Province	1	3	3	3	3	3	6
Punjab	9	12	23	26	28	30	35
United Provinces	44	44	47	48	59	61	65
TOTAL	308	331	411	444	478	540	583

APPENDIX H.

Statement showing the quantity of petroleum imported by sea into British India during the 7 years ending 1911.

NON-DANGEROUS PETROLEUM.

—	1905.	1906.	1907.	1908.	1909.	1910.	1911.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Chittagong . . .	3,970,269	1,823,051	5,547,944	6,308,806	8,825,895	6,977,078	7,959,321
Balasore	10,000	26,200	...	...	...	...	...
Chandballi . . .	367,500	405,000	270,200	206,150	208,200	259,000	227,400
Calcutta	27,144,014	20,342,078	27,342,923	33,379,196	26,599,239	18,642,248	27,089,471
Bombay	22,099,928	17,402,913	22,439,071	24,750,034	24,955,563	24,730,978	27,604,430
Sind	5,157,947	5,007,932	7,171,933	10,448,574	9,719,214	8,295,644	9,689,900
Madras	9,765,384	6,956,459	8,942,869	13,018,601	13,720,767	10,006,706	15,113,287
Burma	1,595,209	1,156,179	1,828,973	2,514,834	1,119,719	1,197,661	1,283,641
TOTAL .	70,110,251	53,118,812	73,543,913	90,626,195	85,148,597	70,109,315	88,967,450

DANGEROUS PETROLEUM.

—	1905.	1906.	1907.	1908.	1909.	1910.	1911.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Calcutta	14,500	...	12,270	20,048	42,965	44,708	83,800
Bombay	66,017	184,243	92,258	110,390	84,793	79,661	106,000
Sind	622	9,795	2,733	25,801	1,844	28,043	3,827
Madras	7,828	38,104	25,400	53,756	15,280	6,459	2,400
Burma	5	...	...	...	55	580	206
TOTAL .	88,972	232,142	132,661	209,995	144,937	159,451	196,233

Statement showing the quantity of petroleum produced in Burma and transported into British India during the year 1911.

—	1911.
	Gallons.
Non-dangerous petroleum	1,00,758,865
Dangerous petroleum	1,619,527

Statement showing the quantity of petroleum produced in Assam and Burma during the 7 years ending 1911.

NON-DANGEROUS PETROLEUM.

—	1905.	1906.	1907.	1908.	1909.	1910.	1911.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons
Assam	1,543,212	1,890,942	1,975,094	2,016,978	2,144,093	2,033,772	2,142,349
Burma	67,062,170	95,848,500	75,397,762	78,044,435	134,080,703	143,387,116	148,874,019
TOTAL .	68,605,382	97,739,442	77,372,856	80,061,413	136,224,796	145,420,888	151,016,368

DANGEROUS PETROLEUM.

—	1905.	1906.	1907.	1908.	1909.	1910.	1911.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Assam	21,014	21,855	48,017	67,256	36,588	56,736	80,534
Burma	11,988,220	11,670,200	15,043,700	18,055,500	18,479,394	18,245,501	21,228,403
TOTAL .	12,009,234	11,692,055	15,091,717	18,122,756	18,515,982	18,302,237	21,308,937

APPENDIX I.

[Report.]

No. 339, dated the 14th March 1912.

From—Captain J. S. Rush, Inspector of Explosives, Bombay,

To—The Officiating Chief Inspector of Explosives with the Government of India.

In continuation of my telegram of the 12th instant I have the honour to submit the following report :—

1. The magazine that blew up on Tuesday, 12th instant, at 1-30 P.M., was a hulk, 45 feet in length by 13 feet in breadth, which was licensed by the Chief Engineer of the Bombay Port Trust for the storage of 4,000 lbs. of Nitro-Compounds, Class III, Division I, and 1,000 detonators. At the time of the explosion it contained 1,618 lbs. of dynamite, 562 lbs. of gelignite and 645 detonators.

2. After the explosion nothing remained of the magazine except a few small fragments of wood, while the boat that had conveyed the party on board about 8 A.M., and was lying alongside had also disappeared, and a large hole had been blown in the side of the boat, anchored some distance away, in which the men were allowed to cook their food.

3. The barge was anchored near Tucker's Beacon, about two miles from the shore and isolated from the shipping in the harbour.

4. The magazine had been licensed for several years, and complied with the requirements of the regulations. No matches or lights of any kind were allowed on board except the ship's lamps which were taken away each day to be trimmed and lighted. There was a special boat, anchored some distance away, in which the men could cook their food, and those working on the barge were supplied with special clothing and searched every day before going on board.

5. There were two watchmen on the barge who remained all night and generally left in the daytime when the working party came on board. These men were away at the time of the explosion and so escaped.

6. The party on the hulk consisted of the assistant time-keeper, one chargeman, four assistant chargemen and four boatmen who were searched before leaving the drilling barge in the morning.

7. The magazine barge had four compartments separated by double bulkheads. The first was merely a locker for the anchor chain, the second the magazine in which the Nitro-Compounds were stored, in the third the charges for the drilling barge were filled, while the one aft was used for the storage of detonators.

8. The charges for the drilling barge consisted of dynamite or gelignite which was first removed from the paper wrappers and then filled into tin cylinders, a wooden rammer being used to press it down. No detonators were fixed to the charges here, this being done on the supply barge, which is anchored near the drilling barge, as the charges are required.

9. I would here mention that while at first view the idea of filling charges on a magazine barge would not, perhaps, recommend itself, the conditions of floating magazines in a harbour are not quite the same as danger buildings ashore. In the latter case it is an easy matter to put up as many small buildings as may be required and protect them by substantial mounds of earth, but in a harbour it does not seem desirable to multiply your magazines and thus create a large danger area which it would probably be difficult to provide. Consequently it would appear best to confine the explosive to one barge and to see that it is so isolated that in the event of an accident the shipping and shore do not suffer. In the present instance no damage was done to any of the shipping and only a few glass windows were broken ashore.

10. But there is a point to which I would draw attention and that is the number of men on the barge. After rowing the time-keeper and chargemen to the magazine the four boatmen should have returned at once. The loss of life would then have been reduced by nearly half.

11. As the magazine has disappeared and all who were on board have unfortunately been killed no evidence is available as to what work, if any, was actually being performed at the time of the explosion and the cause of the accident can only be conjectured. The magazine and explosives have been inspected twice a year by this Department and have always been found to be in a satisfactory condition. The compartments in which the latter were stored were well ventilated and the temperature not above normal. Lieutenant-Colonel C. A. Muspratt-Williams, R.A., Chief Inspector of Explosives, when he inspected this magazine last November, remarked that it was one of the best floating magazines that he had seen. The explosives were manufactured by Messrs. Nobel and Company, and were not more than eighteen months old, so that there is no probability of the explosion having been caused by defects in the magazine or by the decomposition of the explosives. I think that the probability of another boat running into the barge extremely remote, for it was anchored between two beacons, in a place quite out of the ordinary track even of country boats.

12. The explosion may have been caused by the accidental dropping of a box of dynamite down the gangway on to the floor, where possibly some loose dynamite or detonator may have been lying, though there should not have been any detonators in this compartment. Possibly too much force may have been used in pressing the dynamite into the cylinders. There is also the chance that, in spite of all precautions and warnings, some of the men had matches or a light on board, but the actual cause of the accident will never be known now.

13. The Chief Engineer of the Bombay Port Trust suggests that as the magazine on Elephanta Island will not be required for the storage of explosives for blasting there after this month it should be used, instead of a floating magazine, to store the explosives used on the drilling barge, and that a small shed be erected at a suitable distance in which the charges would be filled. I think this is an excellent proposal and would place things on a more satisfactory footing.

14. I would make the following recommendations :—

(1) That when filling the canisters the explosive should not be removed from the paper wrapper.

(2) That only the minimum number of men compatible with efficient work be allowed in the charging shed.

(3) That the work be carried out under the supervision of a responsible European.

APPENDIX J.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1911 to 31st December 1911.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons.	
					Killed.	Injured.
			Explosives.			
1	28th Jan. 1911	Blasting powder	Periyakulam, Madura.	The District Magistrate reported that a contractor was playing with blasting powder when an explosion occurred injuring 6 persons of whom four died. The contractor was prosecuted and convicted.	4	2
2	7th March 1911.	Gunpowder .	Salem . .	The Magistrate reported that a man was setting fire to some fireworks by means of a lighted rope, some sparks from the rope fell on a pot containing gunpowder which exploded fatally injuring one man and seriously injuring two others.	1	2
3	5th May 1911 .	„ . .	Jubbulpore .	The Deputy Commissioner reported that some gunpowder and fireworks were exposed in the sun to dry and by some means undiscoverable, the powder caught fire and in its turn set fire to the fireworks and to a hut about five paces off, but no one appears to have been injured.	...	...
4	10th July 1911	„ . .	Salem . .	The Magistrate reported that a man and his wife were standing near the smithy of a blacksmith which was at work at the time. They had with them some gunpowder which was tied up in a piece of cloth and placed beside them. A spark from the smithy fell upon the gunpowder and caused an explosion fatally injuring both the persons.	2	...
5	2nd Sept. 1911 .	„ . .	Ellaikuttai .	The Magistrate reported that some blasting powder partly covered with a cloth and partly spread out on a piece of paper was lying near a well in which blasting was being done. A spark from the charge fell on the powder and caused an explosion killing one man and injuring another.	1	1
6	8th Sept. 1911 .	„ . .	Taramangalam, Salem.	The Magistrate reported that two men were preparing blasting powder in a stone mortar. The powder ignited and exploded from friction with the mortar and both persons were fatally injured.	2	...
7	14th Oct. 1911 .	„ . .	Kapilaswarapuram, Godaveri.	The Magistrate reported that 4 boys were engaged in making paper cylinders and filling them with powder. near the place where they were seated an open Kerosine lamp was placed on a Kerosine oil tin. Somebody's hand touched the burning lamp, which fell into the powder exposed on the floor, which caused an explosion. One lad died from injuries received and three others received severe injuries.	1	3
8	17th Nov. 1911 .	„ . .	Kilpadi, South Canara.	The Magistrate reported that a man was grinding saltpetre, sulphur and charcoal in a grind stone when an explosion occurred fatally injuring the man.	1	...
9	7th Dec. 1911 .	„ . .	Usilampatti, Madura.	While a man was drying gunpowder on a hearth, it caught fire and fatally injured him and his wife.	2	...
				TOTAL .	14	8

No	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons.	
					Killed.	Injured.
			Explosives—*contd.*			
10	26th February 1911.	Gelignite . .	Bombay . .	The Commissioner of Police reported that while blasting operations were being carried on a piece of rock weighing about 2 lbs. was blown from a depth of 30 feet and fell at a distance of 500 yards fatally striking a labourer on the back of his head.	1	...
11	5th March 1911.	Dynamite .	Tagundaing, Meiktila.	While two men were deepening an old bore hole with a view to re-firing, an explosion occurred causing them severe injuries.	...	2
12	August 1911 .	„ .	Tirumangalam, Madura.	The Magistrate reported that while a man was going to see his lands for ploughing, he tampered with a rock, in which there was a blasting charge, when an explosion occurred severely injuring him.	...	1
13	6th Nov. 1911 .	„ .	Bombay . .	For details see appendix M.	3	26
				TOTAL .	4	29
14	10th Jan. 1911 .	Bomb containing sulphide of arsenic and chlorate of potash.	Kamaksit, Rangoon.	A blacksmith found a small tin box on a shelf in his house and on opening it he found a small quantity of cotton under which was a small bundle wrapped in cloth. As soon as he handled the bundle it exploded blowing off the 1st joints of his left thumb and index finger and causing other slight injuries.	...	1
15	23th Jan. 1911 .	Fireworks consisting of chlorate of potash and sulphide of arsenic.	Ahmedabad .	The Magistrate reported the occurrence of an explosion whereby a man was seriously injured. It is presumed that he was experimenting with the substances when an explosion took place.	...	1
16	25th Feb. 1911.	Fireworks . .	Mudanidambar, South Canara.	The Magistrate reported that a native was grinding sulphur, saltpetre and charcoal for fireworks with a stone with the result that an explosion occurred seriously injuring him as well as his brother who was near by preparing rockets.	...	2
17	29th April 1911	Fireworks consisting of sulphur, saltpetre and charcoal.	Noakhali . .	A native was manufacturing fireworks in a shed in which fireworks were stored. The fireworks caught fire and exploded fatally injuring the man.	1	...
18	4th May 1911	Firework powder consisting of Sulphur, Nitre, Potash and Mainsula.	Malayaputty, Ganjam.	The Magistrate reported that while a native was grinding the powder it exploded and burnt him fatally.	1	...
19	8th May 1911 .	Fireworks .	Shahjahanpur .	The Magistrate reported that a man was manufacturing lime light torches consisting of potash and colouring matter which from some cause unknown exploded and set fire to the premises. The man was burnt about the hands and legs and died five or six days after.	1	...
20	10th May 1911 .	„ . .	Hosabettu, South Canara.	A man was grinding on a grindstone firework material consisting of sulphur, saltpetre and charcoal. It appears, he noticed, from the sound that there was some grit in the mixture, but before he could stop grinding, the mixture ignited and burned the man in various parts of the body. He died from the effects about five days later.	1	...
21	13th May 1911 .	Fireworks composition.	Coconada . .	The Magistrate reported that two women were engaged in pounding sulphur, charcoal and saltpetre in a wooden mortar by means of wooden pestles with iron ferrules. A spark was caused by the iron ferrules coming into contact with one another and an explosion occurred fatally injuring the two women and two others who were in the room at the time.	4	...

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons.	
					Killed.	Injured.
Explosives—*concld.*						
22	27th May 1911 .	Firework composition.	Mangalampet, South Arcot.	The District Magistrate reported that two men prepared adirvedi powder composed of saltpetre, sulphur and charcoal in a wooden mortar with pestles also made of wood. After the removal of the powder from the mortar, blue light powder composed of saltpetre, sulphur, lime water and groundnut oil was put into the mortar and powdered. Suddenly the blue light powder in the mortar took fire and fatally burned the two men and burst the roof of the house.	2	...
23	13th Aug. 1911. .	Fireworks composition, *viz.*, chlorate of potash and sulphate of antimony.	Howrah . .	The Magistrate reported that a man was mixing the composition when it exploded seriously injuring him and five boys who were near by.	...	6
24	14th Oct. 1911 .	Fireworks consisting of chlorate of potash and sulphur.	Calcutta . .	The Commissioner of Police reported that a lad loaded a rusty iron pipe with the composition and set fire to it. The pipe burst and injured another lad who happened to be present at the place.	...	1
25	16th Oct. 1911 .	Fireworks called Nelatapakayalu consisting of chlorate of potash and sulphide of arsenic.	Mulastanam, Godaveri.	The District Magistrate reported that a native was separately pounding chlorate of potash and sulphide of arsenic in earthenware and stoneware vessels respectively with a small stone pestle when an explosion occurred fatally injuring the man and causing injuries to four others.	1	4
26	18th Oct. 1911 .	Fireworks consisting of chlorate of potash and momchal.	Calcutta . .	The police reported that a lad used to make fireworks and was powdering some momchal on a curry stone, when his father was going upstairs he heard a loud report and found the lad lying in the verandah with injuries and unconscious and while he was being removed to hospital he expired.	1	...
27	19th Oct. 1911 .	Fireworks composition, *viz.*, chlorate of potash and haridalam (sulphide of arsenic).	Rajahmundry .	The Magistrate reported that a native was grinding the composition with a pestle, when an explosion occurred injuring him.	...	1
28	20th Oct. 1911 .	Fireworks .	Calcutta . .	The Commissioner of Police reported that a native kept a mixture of chlorate of potash and sugar in a brass plate near a phial containing sulphuric acid and went out to test a firework when he heard a loud explosion, and on his return found three children whom he left near by injured. It is presumed that the children must have spilt the sulphuric acid into the mixture.	...	3
29	21st Oct. 1911 .	Fireworks, chlorate of potash and sulphide of arsenic.	Jagannadhapuram, Godaveri.	The Magistrate reported that a native lad was mixing the ingredients in an earthen vessel with a stick when an explosion occurred seriously injuring the lad.	...	1
30	26th Nov. 1911 .	Bomb, containing traces of sulphur and nitrate.	Tuticorin . .	At first locally reported as a bomb case, but no malice was proved. The inmates of a house with the doors shut were apparently unlawfully experimenting with some explosive in a box or canister of the nature of a bomb, but no satisfactory explanation of the explosion which occurred could be gleaned.	1	4
				TOTAL .	13	24

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons.	
					Killed.	Injured.
				Petroleum.		
31	5th Jan. 1911	Petrol	Rangoon	The Marine Surveyor, Rangoon, reported that under instructions he examined on the 9th and 10th January 1911 the motor launch "Columbus" then lying on the land, close to Batatoung Jetty. Forward of engine room bulk head the launch above the water line is a total wreck, the shade roof, main deck, and hull timbers being completely destroyed and deck beam angles and frames angles badly twisted. The fire appears to have started in the forward hold and judging by the condition of the collision bulk head and deck beams it is apparent that there had been a violent explosion or series of explosions in this hold. The launch, which is composite built, is 55 feet long, 12 feet 6 inches beam, 5 feet 6 inches deep. The forward compartment from stem to collision bulk head is used as a chain locker and the only opening is through a small hatch in main deck. The compartment aft of this is a cabin or hold extending from side to side of launch and 26 feet 6 inches in length from collision bulk head to engine room bulk head. Aft of engine room bulk head is a two cylinder four cycle kerosine motor made by the Bowen Company, Geneva, New York, United States, America. At Port side of engine room and close to bulk head is a 2 gallon tank for petrol used in starting engine. At aft starboard side is a 50 gallon tank for Kerosine used after engine has been started by petrol. The engine is set in a tray to prevent leakage into bilges and both tanks are also set in trays. Ignition is by batteries or magneto and all wires are well insulated. The exhaust pipe runs aft to a silencer placed athwartships with pipes to both sides of launch and silencer pipes are well lagged to prevent heat radiation. There are two ventilators to engine room with cowls above shade deck and carburetter air supply is also taken from above shade deck; aft of engine room is a W. C. and a galley. The fire appliances were two boxes of sand, four chemical fire extinguishers and four fire buckets and a notice is placed on deck warning passengers against smoking in vicinity of engine room. On survey certificate is a note against carrying loose tins of petrol and against filling tanks between sunset and sunrise. In a cargo boat anchored close to launch he found between 75 and 100 empty motor spirit drums all badly scorched and several torn by bursting. It appears that on the afternoon of the 5th January 1911 the launch had taken the empty drums from the motor launches "Ma Hla" and "Ma Thein" with the intention of taking them down to the Rangoon refinery the following morning. Owing to position of plug in drums it is extremely difficult to thoroughly drain out drums and in most cases plugs are seldom replaced and with drums of this description stored in a confined space they would be highly dangerous; these drums were stored in fore hold of launch, and it is admitted that one of the crew went down the hold which would be full of spirit vapour with a naked light, and there is no doubt that this was the cause of the explosion and subsequent fire. He was also of the opinion that there were a number of full drums of spirit for use on the launch but where stowed is not known. He examined both tanks in engine room and found 36 gallons of motor spirit in the 50 gallon tank and one gallon in the 2 gallon tank. The Chief Inspector of Explosives who visited the motor launch "Columbus" at a later date, concurred in the opinion expressed by the Marine Surveyor.	...	4

No.	Date of accident.	Nature of accident.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons.	
					Killed.	Injured.
			Petroleum—*contd.*			
32	10th Jan. 1911	Naptha in paint composition.	Rangoon . .	An explosion occurred on board the motor auxiliary screw Schooner "Mascott" at about 7·30 P.M. The steamer belonged to Messrs. Attia and Maneckjee and had only lately been handed over to them by Messrs. Bulloch Bros. of Rangoon who had constructed her and she was about to make a voyage to the Cocos Islands with a miscellaneous cargo and at the time of the accident a water boat was along side her for the purpose of filling the water tanks on board with fresh water for the use of the crew during the voyage. The vessel was of 169·43 gross tonnage, was schooner rigged, and had an auxiliary motor engine which was capable of driving her about 6 knots under favourable conditions. For the supply of motor spirit there were 4 main tanks built into the hold of the vessel and capable of holding a supply of about 3½ tons. per tank. For direct supply to the engine there were 2 deck tanks fitted with air pipes of proper diameter for carrying off vapour, and these tanks could be filled from the main tanks by means of either the engines or an independent hand pump. The Chief Inspector of Explosives who visited the Schooner and held an informal enquiry elicited the following facts. The water hose from the water boat was by mistake on the part of some members of the crew (who were mostly Arabs and new to the vessel) connected to the after hold bilge pipe instead of to the water tank pipe. When it was found that the water was not getting into the water tanks, three of the Mascott's crew, one of whom obtained a hurricane lantern from the stern of the launch, although electric torches were provided, entered the after hold to ascertain whether water was going into the hold. Instantaneously with their entry into the hold an explosion occurred. The three men who entered the hold and one just outside the after hold were so burnt that they subsequently died and 11 others were injured. There was no fire and practically no damage done to the schooner. The hatch fore and aft beam and the after bulk head were slightly scorched. The Chief Inspector of Explosives noticed that up to the iron works in the hold had been freshly painted with red paint and ascertained from Mr. Attia that he had supplied the paint, which contained a large proportion of naptha in it. Had the explosion been caused by petrol vapour leaking from the petrol tanks there would have been a flash back to the tanks and a large conflagration and the Chief Inspector felt sure in his own mind that the explosion was caused by a light being brought in contact with a mixture of air and naptha vapour from the paint used in the after hold which had not been ventilated, and reported to this effect to the local Government and recommended that a committee should be assembled to draw up rules for the control of motor boats on the lines of the Board of Trade instructions, that inflammable paints should not be allowed for the painting of interior surfaces, or that, if used, it should be insisted that the vapour should be drawn off by fans or other ventilating arrangement.	4	11
33	3rd February 1911	Kerosine . .	Bombay . .	The Commissioner of Police reported that a lamp was being taken into a store room containing rubber tyres, etc., as well as 6 or 7 drums of petrol, when it fell and exploded. The whole store room was burned and a European foreman was severely burned about his legs and arms.	..	

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of Persons.	
					Killed.	Injured.
Petroleum—*contd.*						
34	22nd Feb. 1911.	Kerosine .	Bombay . .	The Commissioner of Police reported that a woman was lighting a wall lamp placing a small lighted tin lamp on the floor at her feet when her clothes caught fire and she was burned about the body.	...	1
35	1st March 1911	„ .	Bombay . .	The Commissioner of Police reported that a Hindu girl while playing went near a kerosine lamp, which set her clothes on fire. She was fatally burned.	1	...
36	26th March 1911	Petrol . .	Bangalore .	A native chauffeur opened the petrol tank lock of a motor car to fill 2 tins of petrol required for another car. A man with a lighted lantern came up to see if the tins were filled, when the vapour immediately took fire, burning the motor shed and one of the cars and the hands of the two men.	...	2
37 38	28th March 1911 and 31st March 1911	Crude oil . .	Yenangyoung .	Two fires occurred at wells Nos. 4 and 16 of the Indo-Burma Petroleum Company, which were supposed to be incendiary owing to the replacement of the usual durwans by ex-sepoy Punjabi durwans. No lives were lost and no damage was done to the surrounding wells.	...	...
39	30th March 1911	Petrol . .	Payundaung Creek, Rangoon.	An explosion occurred on board the motor launch "Ma Sein" killing 2 men and injuring 3 others, 2 of whom died afterwards of their injuries. The "Ma Sein" was a twin screw launch driven by kromhout engines just built to the order of Messrs. E. S. Attia and Maneckjee by the Burma Engineering and Trading Company of Rangoon. The Chief Engineer, Royal Indian Marine, who visited the "Ma Sein" after the explosion came to the conclusion that it was due to petrol vapour coming in contact with a naked light. The fire which took place after the explosion was put out without much damage being done to the vessel.	4	1
40	20th April 1911.	Crude oil . .	Yenangyoung .	A fitter of the Rangoon Oil Company struck a match and after lighting a cheroot threw the lighted match near No. 12 well casing which caused a fire. Another fitter was very badly burned.	...	1
41	8th June 1911 .	Kerosine . .	Bombay . .	A Hindu woman, aged 90 years lighted an open kerosine lamp, when the ends of her Sari caught fire and she was fatally burnt.	1	...
42	26th June 1911 .	„ . .	„ . .	A Hindu boy was playing with a stick in a room when he accidentally upset a lighted kerosine oil lamp on to his clothes burning him fatally.	1	...
43	3rd Aug. 1911 .	„ . .	„ . .	The Commissioner of Police reported that six tins of kerosine oil had been placed in a large iron drum which it appears started leaking and in his endeavours to repair the leakage, an Irani lit a lamp which was placed too near the drum which caught fire. The Irani and a woman who was holding the lamp got slightly burnt.	...	2
44	9th Aug. 1911 .	„ . .	„ . .	The Commissioner of Police reported that a Goanese accidentally knocked over a kerosine oil lamp, which fell and burst with the result that he was severely burnt.	...	1
45	25th Aug. 1911 .	Petroleum gas .	Yenangyoung .	After the drillers had left the Burma Oil Company's rig No. 347, a gassing well, three coolies stayed behind to bathe. One of them struck a match to light his cheroot in the derrick and set fire to the gas. The fire burnt all three men, one of whom died. The burning gas was put out by the fire brigade with no damage except some burning of the rig floor and tackle.	1	2

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accidents so far as ascertained.	Number of persons.	
					Killed.	Injured.
			Petroleum—*contd.*			
46	4th Sept. 1911 .	Kerosine . .	Bombay . .	The Commissioner of Police reported that a drunken man poured kerosine oil over himself and set fire to his clothes. He was removed to hospital where he died from the effects of the burns.	1	...
47	10th Sept. 1911 .	„ . .	Calcutta . .	A respectable Hindu widow was found dead in her room with extensive burns on her body. The surrounding circumstances showed that the deceased had previously saturated her clothes with kerosine oil and holding her deceased husband's photograph in her hand, set her clothes on fire. (*Newspaper*).	1	...
48	15th Sept. 1911 .	Petrol . .	Delhi . .	The Magistrate reported that two mistris and two menials entered a petrol shed in the Durbar Area to have their evening meal on a small landing between the door and steps leading to the storage pit, which they had cleared for eating purposes. A small box was placed here and all preparations were made for their food. One of the mistris had an open light which for some time he held above his head and then placed on the box. As soon as he did this it came in line with the petrol vapour and there was an immediate burst of flames and almost immediately the tins began exploding. The shed and 3,000 gallons of petrol were destroyed and the four men were seriously injured one of whom died. The shed consisted of an underground pit with a corrugated iron roof and conformed to the requirements of the Petroleum Act, VIII of 1899.	1	3
49	28th Oct. 1911 .	„ . .	Calcutta . .	While a native was cleaning a motor car with petrol another man came up to him and lighted a cigarette when an explosion occurred. The motor car took fire and the man who was cleaning the car sustained injuries through burns received.	...	1
50	31st Oct. 1911 .	„ . .	Delhi . .	A fire broke out in the yard of the Railway Goods shed in a stack of 250 crates containing 2,000 gallons of petrol. It is presumed that one of the Chowkidars or some other person in passing with a lamp ignited the vapour arising from leaking petrol and caused a total destruction of the consignment, or that ignition of the vapour was caused by some body in passing, emptying his cheelum or throwing a cigarette end near the petrol.	...	...
51	25th Nov. 1911 .	Kerosine . .	Bombay . .	The Commissioner of Police reported that a man whilst lighting a Kitson lamp the small pipe broke and the oil from the lamp splashed on him and his clothes caught fire burning him all over the body.	...	1
52	December 1911 .	„ . .	„ . .	A native was admitted to hospital suffering from burns, the result of a tin of kerosine oil bursting. The oil was left near a furnace and it exploded.	1	...
53	12th Dec. 1911 .	Crude oil . .	Digboi . .	A fitter got into a tank containing four feet of oil to tighten up the nut of a bolt holding the lower manhole door, the nut being below the oil level. He was overcome by the fumes of the as and was asphyxiated.	1	..
54	13th Dec. 1911 .	Kerosine . .	Bombay . .	The Commissioner of Police reported that a lighted oil lamp fell from a girl's hand and set fire to her clothes and body.	...	1
55	13th Dec. 1911	„ . .	„ . .	The Commissioner of Police reported that a native woman burnt herself fatally by an oil lamp upsetting, and setting her clothes on fire.	1	.

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons.	
					Killed.	Injured.
Petroleum—*concld.*						
56	13th Dec. 1911 .	Kerosine .	Bombay . .	The Commissioner of Police reported that flames were seen in a room of a house. The door of the room was burst open when a woman was discovered with her clothes on fire and life extinct. Close to her lay a bottle of kerosine oil and it appears that she set her clothes on fire.	1	...
57	14th Dec. 1911 .	„ . .	„ . .	While a native was carrying a naked light his clothes caught fire burning him about the body.	...	1
58	16th Dec. 1911 .	„ . .	„ . .	While a native was climbing up a loft with a bundle of hay, it came in contact with a naked kerosine oil lamp which was hung to a post. The burning bundle of hay set a stable and adjoining chawls on fire, and the native and an old woman were burnt about the body.	...	2
59	18th Dec 1911 .	„ . .	„ . .	In extinguishing a kerosine lamp a native woman's clothes caught fire, and burnt her so severely that she died from the effects.	1	...
60	19th Dec. 1911 .	„ . .	„ . .	A native woman left her eight months' old son in a room with a naked kerosine oil lamp near by and went out locking the door. On her return after an hour she found the child had been burnt to death.	1	...
				Total .	21	35
Chemicals.						
61	8th Aug. 1911 .	Chlorate of potash.	Calcutta . .	The Commissioner of Police reported that a man was grinding some potasium chlorate when there was an explosion and the man was seriously injured.	...	1
62	23rd Oct. 1911 .	Sulphuric acid .	Bombay . .	The Commissioner of Police reported that a woman placed some sulphuric acid mixed with water in a pot to clean pots with and that during her absence her child drank some of it and subsequently died.	1	...
				Total .	1	1
Miscellaneous.						
63	8th April 1911 .	Oil gas . .	Salumbra, Poona	The District Magistrate reported that about six to eight hundred persons were collected within a court yard to witness a play for which a temporary theatre had been erected. The walls of the court yard were of stone. Over one part of the court yard was a permanent roof, the rest was temporarily thatched in on rafters with a cloth ceiling stretched below. The only exits were a front gate about 5 to 6 feet wide opening inwards in two halves and at the back two narrow doorways leading by intricate passages through a private house to the open street. The lighting was done by three imitation Kitson lamps, one of which went out and was mishandled by some one who tried to re-light it. Free gas from it became ignited and in a minute the roof was on fire. This caused a stampede. The front gate was half closed and naturally many of the audience knowing only of that exit, rushed towards it. People were lying piled on one another in the doorway and had to be dragged out. Many were injured and a few who were children died almost immediately. The roof then fell in and it was impossible on account of the fierce heat to do any thing. 297 people were reported to have been killed and 20 injured.	297	20

No.	Date of accident.	Nature of Chemical.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons. Killed.	Injured.
				Miscellaneous—*contd.*		
64	26th Jan. 1911.	Sulphur matches	Bombay . .	A native child was playing with a box of matches when his clothes caught fire and he was so severely burnt about the body that he subsequently died.	1	...
65	7th June 1911 .	Methylated spirits	„ .	While a man was transferring some methylated spirits from one drum to another, a parsee holding a lighted candle went near the drum when the spirits ignited severely burning the man who was transferring the spirits.	...	1
66	10th July 1911 .	Spirits of wine .	„ .	A servant whilst lighting a stove upset a bottle of spirits of wine which caught fire. In attempting to extinguish the flames four persons were burnt slightly.	...	4
67	17th Sept. 1911.	Methylated spirits.	„ .	The Commissioner of Police reported that two men were burnt extensively about their bodies through a servant spilling methylated spirits while lighting an oil stove.	...	2
68	17th Sept. 1911.	Methylated spirits.	„ .	The Commissioner of Police reported that a woman was fatally burnt by methylated spirits falling on her and setting fire to her clothes.	1	...
				TOTAL	299	27

Summary of accidents during the year 1911.

Explosives or dangerous and inflammable substances.	ACCIDENTS CAUSING LOSS OF LIFE AND BODILY INJURY. Number of accidents.	Number of persons. Killed.	Injured.	Accidents not causing loss of life or bodily injury.	Total number of accidents.
EXPLOSIVES.					
Gunpowder	8	14	8	1	9
Nitro-compounds	4	4	29	...	4
Ammunition	..	...	...	...	...
Fireworks	17	13	24	...	17
TOTAL .	29	31	61	1	30
PETROLEUM.					
Petroleum generally	27	21	35	3	30
TOTAL .	27	21	35	3	30
Chemicals	2	1	1	...	2
TOTAL .	2	1	1	...	
Miscellaneous	6	299	27	...	6
TOTAL .	6	299	27	...	6
GRAND TOTAL .	64	352	124	4	68

APPENDIX K.

Detailed statement showing the number of accidents and persons killed and injured during the six years 1906 to 1911.

Year.	Gunpowder.			Dynamite and other Nitro-Compound Blasting Explosives.			Ammunition.			Fireworks.		
	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.
1906	13	21	28	2	1	2	...	...	...	11	4	14
1907	11	18	20	4	...	6	3	...	4	19	12	20
1908	19	27	64	4	1	4	1	...	1	22	26	23
1909	15	19	26	4	1	5	2	...	2	19	21	41
1910	9	10	11	4	1	4	...	...	...	21	30	58
1911	9	14	8	4	4	29	...	...	...	17	13	24
Total	76	109	157	22	8	50	6	...	7	109	106	180
Average	13	18	26	4	1	8	1	...	1	18	18	30

Year.	Petroleum			Chemicals.			Miscellaneous.		
	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.
1906	10	9	3	...	...	...	3	1	1
1907	15	9	8	...	...	...	6	7	2
1908	41	37	6	6	...	6	5	2	8
1909	23	17	25	3	3	6	5	4	13
1910	19	29	19	2	2	1	8	5	9
1911	30	21	35	2	1	1	6	299	27
Total	138	122	96	13	9	14	33	318	60
Average	23	20	16	2	1	2	5	53	10

APPENDIX L.

Comparative statement showing the number of accidents and persons killed and injured during the six years 1906 to 1911.

	ACCIDENTS CAUSING LOSS OF LIFE OR BODILY INJURY.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of Persons.			
		Killed.	Injured.		
1906	34	36	48	5	39
1907	50	46	60	8	58
1908	75	93	113	23	98
1909	70	68	118	1	71
1910	55	77	102	8	63
1911	64	352	124	4	68
Total	348	672	564	49	397
Average	58	112	94	8	66

APPENDIX M.

No. 207, dated Bombay, the 23rd November 1911.

From—Captain J. S. Rush, Inspector of Explosives,

To—The Chief Inspector of Explosives in India.

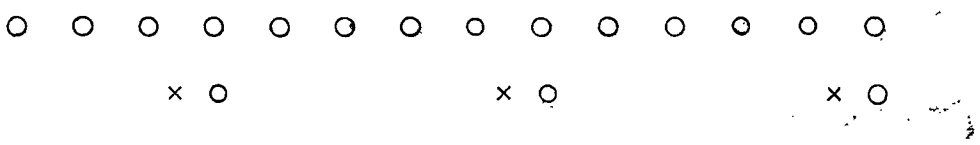
I have the honour to report that in accordance with the instructions contained in your telegram No. 1658 of the 10th instant, which reached me at Dhamangaon that afternoon, I proceeded to Bombay to assist at the enquiry into the cause of the explosion that occurred there when the Port Trust drilling barge No. 94 was at work in the harbour on the afternoon of Monday, 6th instant, by which three Indians lost their lives and several others were more or less injured.

2. On my arrival at Bombay on the 11th instant I called to see the Commissioner of Police, who said that he wished me to attend the enquiry at the inquest and try to ascertain the cause of the explosion.

3. At the time when it occurred, between 2 and 2·15 P.M., there were on board Mr. Tallman, the submarine drilling expert, who had just returned from tiffin, Mr. Ardagh and Mr. Edwards, foremen, and thirty-one Indians. As Mr. Ardagh was not well at the time Mr. Edwards was in actual charge of the operations. The three Europeans fortunately escaped with slight injuries and shock.

4. It would, perhaps, first be well to explain the method of working. The barge is securely moored over the portion of the harbour where it is desired to blast, not only by anchors, but by being lifted out of floatation by four large, upright "spuds," so that there is no chance of its moving accidentally. There are three drilling towers which work simultaneously, the usual method being to drill one line of holes of the required length, move the barge back five feet and drill another, and then explode the two lines. As each hole is drilled it is charged by lowering the tin cylinder containing the explosive down the pipe in which the drill works by means of a small rope attached to a thin piece of marline. When the charge is in the hole it is held there by a wooden rod and the marline is broken by giving it a slight jerk. The man then feels with the rod that the charge is in position and this is also checked by means of marks on the rod showing the depth below water. The rod is then raised, the three drilling towers moved along five feet and the operation repeated until a sufficient number of holes have been drilled in one line. The barge is then moved back five feet. This is measured on a wire attached to a beacon, and the barge is placed in a parallel position to the first line of holes by means of an optical square and marks on the harbour wall. It is then securely fastened and taken out of floatation again before drilling is begun.

5. In the present instance one line of fourteen holes had been drilled and charged, the barge moved back and three holes, *i.e.*, one by each drill, in the second line completed and charged. The drills had been moved along five feet and the boring of the second set of three holes just begun when the explosion occurred. The plan underneath will help to illustrate this, the charged holes being shown by circles and the holes on which the drills were working by crosses.



6. It has been customary to load all the first line and all the second line of holes except the last three with charges of nine, twelve or twenty pounds of dynamite, according to the nature of the rock that it was desired to blast. In this case nine pound charges were being used. No detonators were placed in these charges. The last three holes are usually loaded with charges of gelignite, each containing a detonator with wires attached, on the supposition

that the explosion of these charges of gelignite would detonate all the others, and it is reasonable to expect that such would be the case.

7. I might here state that the charges, consisting of small cartridges packed in tin cylinders, are made up in one compartment of the Port Trust floating magazine. The cylinders are made watertight by the insertion of a wooden plug and plaster of Paris. About six inches of old cable are fixed in and project from the plug, and to this is secured the marline by which the charge is lowered as described above.

8. The charges required are indented for forty-eight hours beforehand on a printed form, and as they are made up, they are taken to a barge anchored near the drilling barge, and are obtained from the former as they are required, it being usual to send enough for one row of holes at a time. Owing, however, to the different weight of the charges sometimes required, it has not always been possible to have the exact number on the drilling barge, and there was frequently a small surplus. In the present instance fourteen charges were recovered from the barge after the explosion, whereas only eleven holes remained to be drilled in the row.

9. It transpired from the evidence that on the day of the accident there had been considerable slackness in the method of obtaining charges from the supply barge and in dealing with them on the drilling barge. Not one of the Europeans on board could state how many charges had been sent for that day nor how many there were on the barge at the time of the explosion.

10. On Tuesday, 14th instant, accompanied by Mr. Wales of the Port Trust I visited the scene of the explosion where a diver was at work. Shortly before our arrival he had brought up an unexploded charge which had attached to it the remains of the marline by which it had been lowered. The tin canister was dented and bent to an angle, so that in my opinion there is no doubt but that it had been in position at the time of the explosion and had failed to detonate. This is important evidence and, I think, gives the clue to the cause of the premature blast.

11. Another charge was brought up by the diver the next day, but as no marline was attached to it and the canister was uninjured it is probable that this charge had rolled off the deck when the barge heeled over.

12. On the afternoon of the 21st instant, accompanied by the Chairman and Chief Engineer of the Port Trust, I saw the barge which had been raised and placed on the slips in the Port Trust workshops. It had sustained very little damage. The planks were started in some places, and it was on account of the leaks at these places that she sank about an hour after the accident. There was some slight damage to the machinery, but nothing of importance. Two of the drilling towers, which were also very little damaged, went overboard just after the explosion, the reason of their fall being that the shock had bent the overhead rail which held them in position. It was on these two towers that most of the men who were killed or injured were working at the time. The damage done to the barge indicated that the explosion occurred at the side at which the towers were situated and that it was some little distance from the barge.

13. Of the several theories that might be advanced to account for the premature explosion some can be eliminated at once.

(*a*) From the nature of the damage sustained by the barge it was very evident that the blast occurred under the water and not amongst the charges on deck, fourteen of which were afterwards recovered intact.

(*b*) It could not have been caused by the accidental manipulation of the firing gear as none of the charges that had been put down had wires or detonators attached.

(*c*) From the comparatively small damage that was done to the barge it may safely be inferred that after the first line of holes had been charged the barge had been moved back the required five feet and was in the correct position. Otherwise, had it not been so moved and placed, and consequently been over the first line of holes, the damage would undoubtedly have been much more severe.

(*d*) I do not think that after having charged the first three holes in the second line these men, who are accustomed to this work and appreciate its danger, would carelessly start drilling again without moving the towers. All the evidence stated that they were moved and drilling begun on the second set of three holes.

(*e*) The theory of Mr. Tallman and Mr. Ardagh is that when the khalassi was tying the marline on to a charge that was to be put in one of the first three holes in the second line, he dropped it overboard, and without saying anything about it, got another. They think that the one thus dropped sank in a diagonal direction on account of the tide and so was under the drill when it was started on the second hole. Such a contingency should not have been possible if proper precautions had been taken in issuing the charges, and as all the men denied having dropped one, I am unable to endorse this theory.

(*f*) Mr. Edwards stated that this might have occurred, but that he thought that it was more likely that the drill got on to an old charge which had been there some time. But blasting had not been done on this area at any time before the last few days, and, moreover if a charge had been under water for any considerable time the explosive would have become more or less disintegrated and harmless as the tin cylinder would have rusted away.

14. It transpired from the evidence, however, that during the past four days some three hundred charges had been put down in the vicinity of the ground on which they were working, each charge five feet apart, and that only a small percentage of them, about three in each blast of twenty-eight, had detonators attached. Now while it might reasonably be presumed that this would be sufficient, and that the charges thus fired would detonate all the others, instances are not unknown in which, for some reason or other, a charge has not exploded. The fact that in this case one was found by the diver is a proof of this, and I am of the opinion that the premature firing of the blast was due to the drill getting on to a charge which had been put down during the past day or two, but which had not detonated with the others. It had probably been thrown into this position by the blast or had been washed there by the action of the tides.

15. At the adjourned inquest on the 22nd instant the jury returned a verdict to this effect.

16. I would submit the following recommendations regarding the blasting in the harbour which, if approved of by you, might be communicated to the Port Trust for consideration :—

(*a*) That a detonator should be used with each alternate charge.

(*b*) That, if possible, a reliable diver should go down after each blast to ascertain that there are no unexploded charges left. He could also check the position of the barge from the last line of holes. If this were done immediately after the blast, while the next line of holes was being drilled and charged, there would presumably be no loss of time.

(*c*) That the charges on the supply and drilling barges should be kept out of the sun in a locked box or cupboard, and that the charge for each hole be issued by the European in charge of the drilling barge when the hole is ready for charging.

(*d*) That the excellent rules for the guidance of the work, which had been drawn up by Mr. C. W. Wales of the Port Trust, after being brought up to date in one or two minor particulars, should be translated into the vernacular and that copies in English and the vernacular be kept in conspicuous places on the drilling barge.

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Indian Explosives Act (IV of 1884).

Indian Petroleum Act (VIII of 1899).

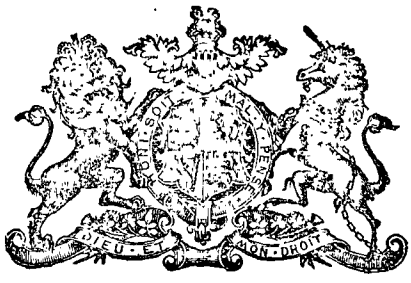
FOURTEENTH ANNUAL REPORT

OF THE

CHIEF INSPECTOR OF EXPLOSIVES IN INDIA

BEING HIS

Annual Report for the Year ending 31st March 1913.



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Fourteenth Annual Report of the Chief Inspector of Explosives, India.

No. 837.

FROM

LIEUTENANT-COLONEL C. A. MUSPRATT-WILLIAMS, R. A.,
Chief Inspector of Explosives in India,

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,
Department of Commerce and Industry.

Simla, the 16th May 1913.

SIR,

I have the honour to submit herewith a report of the work of my Department during the year ending 31st March 1913.

Personnel.

2. During the year under review, I was absent on combined leave out of India from 3rd March till 11th November, and during this period Captain J. F. Tyrrell, R. A., Ordnance Department, officiated for me, and I owe him my thanks for the able manner in which he carried out the duties of the post.

Number of magazines.

3. During the year 1912, 161 licenses (three more than in the previous year) were granted in British India under Rule 17 of the rules to regulate the manufacture, prossession and sale of explosives. The number of magazines licensed was 217 or the same as for 1911, and is in excess of the number of licenses granted, because in a number of cases firms have two or more magazines in one place under one license. A statement showing the number and location of the magazines and also the number of licenses granted in British India during the year 1912 is given in Appendix A, and a statement showing the number of magazines and licenses granted during the past ten years is shown in Appendix B.

Inspection of explosives magazines during the year.

4. During the year, 399 inspections of magazines were made; a number of magazines being inspected two or three times. Those magazines are inspected most frequently which are situated in the neighbourhood of town or in populous localities, or which contain large quantities of explosives, or any explosive, which on account of its greater susceptibility to decomposition and consequent ignition, it is considered advisable to examine and test more frequently than other explosives. The Roburite Factory at Karachi was also inspected.

Condition of magazines.

5. The magazines generally are in good order, and as usual magazine owners have been found most willing to carry out recommendations even when involving considerable expense, and my thanks are due to them for making my duties easy in this respect.

6. The physical condition of all explosives in the different magazines during the year was found to be good, with the exception of the following explosives which were found to have deteriorated or to have become defective, and were destroyed :—

Condition of explosives in magazines.

(*a*) 22 coils defective fuze and 88 electrically defective detonators at Messrs Gillanders, Arbuthnot and Co.'s magazine at Barakar;

(*b*) 624 lb. gunpowder, 895 coils fuze and 235 detonators at the Bengal-Nagpur Railway Co.'s magazine at Raneepur;

(*c*) 200 detonators at the Raneegunge Coal Association's magazine at Kustore;

(*d*) 5 lb. Amberite and 6 lb. Black powder at Messrs. Elahi Bux and Co.'s magazine at Meerut;

(*e*) 31 cartridges of dynamite at the Madras and Southern Mahratta Railway Co.'s magazine at Arkonam;

(*f*) 10 detonators at the Great Indian Peninsula Railway Co.'s magazine at Mohpani Colliery;

(*g*) 7,614 detonators at the Assam-Bengal Railway Co.'s magazine at Haflong;

(*h*) 2 lb. 2 oz. Monobel powder at the Bengal Mica Syndicate's magazine at Koderma;

(*i*) 2 boxes Schultze gunpowder at the Calcutta Port Commissioner's magazine at Moyapur;

(*j*) 198½ coils fuze at the Equitable Coal Co.'s magazine at Deshergarh.

(*k*) 210 electric detonators at the Bengal Coal Co.'s magazine at Pahardea;

(*l*) 20,000 packets of crackers at Messrs. C. Abboy Chetty and Son's magazine at Tondiarpett. These had got damaged during the floods at Madras.

7. During the year under report two thefts of explosives were reported to this office.

Thefts from magazines.

(*a*) The Dharmpur-Hosur Railway extension magazine at Hosur was broken into on the night of the 19th September 1912, and 9 lb. dynamite and 57 detonators were stolen;

(*b*) The magazine of the Equitable Coal Co. at Hurriladih, Bengal, was broken into between the 22nd and 24th December 1912, and 10 lb. of dynamite were stolen. The thieves appear to have effected an entrance by breaking the padlock (a strong one) with a crowbar or similar tool. Instructions were given that the magazine should always be efficiently guarded by day and night.

8. Two thousand six hundred and twenty-one tons of explosives were imported into British India during the year 1912, the value being Rs. 27,09,900. Full details showing the different kinds of explosives imported, and the value of each are given in Appendix C. From this Appendix it will be seen that though the value of fireworks imported into Bengal is given, the quantity imported is not shown, as the Collector of Customs states that the quantity imported is not recorded in his office. A comparative statement showing the quantity of explosives imported during the last 10 years is given in Appendix D.

Import of explosives.

9. A list of explosives at present authorsied for importation into British India for general sale has been published in the *Gazette of India*, for information. This list will be found in Appendix E.

Authorised explosives.

10. The draft consolidated rules for the manufacture, possession, sale, transport, and importation of explosives were published for criticism by the Government of India on 13th April 1912, and it is expected that they will be issued shortly. When finally issued, they will be a great improvement on the present rules which are issued in 2 parts, one dealing with manufacture, possession, and sale, and the other with transport and importation. In the new rules, a great deal of superfluous matter which was common to both sets of rules has been removed, and the rules have been brought up to present requirements and well indexed.

Explosives Rules.

Petroleum.

11. During the year under report, 630 licenses for the storage of non-dangerous petroleum, regarding which this Department was concerned or consulted, were granted. This is an increase of 47 as compared with last year. A list of these installations, corrected up to 31st December 1912, and showing the districts in which they are located, is given in Appendix F, and a statement showing the number of licenses granted during the past eight years, is given in Appendix G. In addition to the number of licenses shown in Appendix F, there are, of course, a very large number of storage godowns for the possession of non-dangerous petroleum in non-bulk, licensed by District Officers, of which this Department has no cognizance.

Number of petroleum installations

12. There are also a number of godowns licensed for the storage of dangerous petroleum in non-bulk throughout the country, and the Inspectors of Explosives and I have inspected some of these, when their existence has been brought to our notice, or where they are near non-dangerous petroleum installations or contain more than 500 gallons of petrol.

Dangerous petroleum godowns.

13. During the year the Chief Inspector of Explosives personally visited the large bulk oil installations at Madras, Bombay, Karachi, Calcutta, (Budge Budge and Narculdanga) Chittagong and Rangoon, and also the oil fields of Burma and Assam. He in addition inspected a number of minor installations. In all 723 inspections of non-dangerous petroleum premises were made. 156 inspections of dangerous petroleum godowns were also made by this Department.

Inspection of petroleum installations during the year.

14. The large petroleum installations are usually under efficient European supervision, and are in good order and well looked after.

Condition of major installations.

15. The small or minor petroleum installations are installations in which not more than 50,000 gallons of kerosene oil in combined bulk and non-bulk are stored, and are looked after by Indian Agents, employed by the large oil firms. The oil for these installations is supplied from the major installations at the different ports, and the retail trade is carried out in them. A great deal of inspection of these minor installations has been done by this Department during the last seven years, with the result that their condition is very much improved and the generality of them are in very good order. As a matter of fact when an installation is found not up to the mark at an inspection, it is usually due to the fact that some new Agent has been recently appointed who has not realised what is required of him. The oil companies do not hesitate to change their Agents if several unsatisfactory reports are made of the installations under their charge.

Condition of minor installations.

16. During the year 1912, 77,684,829 gallons of non-dangerous petroleum and 512,333 gallons of dangerous petroleum were imported by sea into British India. The details are given in Appendix H and also the quantity of non-dangerous and dangerous petroleum produced in Assam and Burma during the year, as well as during the past eight years. It will be noticed that there is a great advance in the imports of dangerous petroleum.

Import of petroleum.

Accidents.

17. A list of accidents, with a short account of each, that have occurred with explosives, inflammable substances, dangerous goods, etc., between the 1st January and 31st December 1912, and that have been reported to this Department is given in Appendix I. It will be seen from a perusal of the details that the accidents have practically all been caused by gross neglect of ordinary precautions. In all there were 48 accidents causing 48 deaths and injuries to 72 persons. Comparative statements given in Appendices J and K show the total number of accidents and the number of persons killed or injured by them during the last seven years. As stated in previous reports, it is very doubtful whether all accidents that occur are duly reported to this Department and, therefore, it is very possible that the statistics given are underestimated. I notice that in some parts of India accidents appear more prevalent than in others; but I am inclined to think that such difference may be occasioned by the local authorities in some places being more careful in carrying out instructions to report accidents than they are in others.

Number of accidents.

18. There were ten accidents from gunpowder during the year, causing thirteen deaths and injuries to six persons.

Gunpowder, Class I.

19. Nitro-Compounds were responsible for five accidents, from which five persons were killed and 35 injured.

Nitro-Compounds, Class III.

20. One accident from ammunition (detonator) caused injuries to one person.

Ammunition.

21. Twelve accidents from fireworks caused the death of four persons, and injuries to 16 others. It will be noticed from the details of the accidents that a number of these were caused by Sulphur Chlorate mixtures, the use of which is now prohibited, and as stated in my last report, if this prohibition is strictly enforced, there is no doubt the number of accidents from fireworks will be considerably reduced.

Fireworks, Class VII.

22. There were 17 accidents from petroleum during the year, which were responsible for 25 deaths and injuries to 12 persons. It will be seen from a perusal of the accidents in Appendix I, that carelessness is a prominent feature in most of them. In India the petroleum accidents are caused usually by lights being brought into proximity to oil vapour, to kerosene lamps being upset or falling down and to kerosene being poured on to fires or into lighted lamps.

Petroleum.

23. There were two accidents from chemicals reported during the year, causing injuries to one person.

Chemicals.

24. One accident from miscellaneous dangerous articles and substances was responsible for one death and injuries to 1 person.

Miscellaneous accidents.

25. Three accidents were reported to this Department, whereby eleven persons were killed and three injured.

Government accidents.

(*a*) What might have been a very bad accident took place in the Merchants' magazine, George town, Madras, which is under the control of the police, and therefore not inspected by this Department. This Department was called upon to enquire into the cause of the explosion, and this was made the subject of a special report which is given in Appendix L. From this it will be seen that there was a lack of supervision, and that the rules under the Explosive Act were not observed. The Government of Madras have decided that this magazine shall not be rebuilt, and in its place another magazine is being erected by the Port Trust on the sandy accretion to the south of the Madras Harbour, and will be under the jurisdiction of this Department and inspected by it.

(*b*) A very sad accident occurred at Delhi Fort on the 24th April 1912, by which Staff Sergeant Friend, Ordnance Department, and 7 lascars, who were emptying 6·3 inch and 40-pr. shells, lost their lives. A court of enquiry was held to ascertain the cause of the explosion. There have been several bad accidents in India during the emptying of live shell and it seems a matter for consideration whether it would not be wiser and safer, though more expensive, to dispose of them by firing them off or by dropping them into the sea or other deep water.

(*c*) An explosion occurred on the 3rd July 1912 in the vicinity of a Public Works Department magazine at Kopargaon, Pravara Canals District. The magazine had got flooded through heavy rains, and the officer in charge had given orders that the explosives were to be removed out of the magazine and the water baled out. Unfortunately the water had soaked into several boxes of dynamite, liberating the nitro-glycerine from the dynamite and the nitro-glycerine was deposited as an oily liquid on the floor of the magazine amidst the pools of water. Two of the Indians engaged in transferring the explosives and baling out of the water, collected the oily liquid in 2 tins. One of the Indians said that this oily liquid was good for itch and rubbed some on one of the coolies and later on the same Indian, before returning to work after taking some food, thought he would see, if the oil he had collected, would burn. He put a little on a piece of tin and tried to burn it, but nothing happened so then he took about a pint of it and poured it on the forge fire, when, needless to say, a terrific explosion occurred and of 6 Indians standing round the forge, one was killed instantaneously being terribly mutilated, 2 died later of their injuries, and 3 others were seriously injured.

GENERAL REMARKS.

26. As a number of accidents causing considerable loss of life and serious injury still occur in blasting operations in quarries and in railway construction owing to lack of proper supervision and the carelessness of individuals, I give in Appendix M a number of rules for blasting and precautions to be observed, which can be obtained from this office, if desired by any one.

Rules for blasting.

27. As it has come to notice that in some Government magazines in charge of civil officers there has been a lack of proper supervision and ignorance of the conditions in which a magazine should be kept, in consequence of which accidents have occurred, the question of bringing these magazines under the jurisdiction of this Department is now under the consideration of the Government of India.

Government magazines in charge of civil officers.

28. I think it is as well to draw attention to the danger in using petrol for glove cleaning, if sufficient care is not taken only to use it when there are no lights about. The vapour is heavier than air and may travel and catch fire at some distance, flashing back and enveloping the operator. The following case was seen in the "Civil Military Gazette." A lady had cleaned a pair of gloves with petrol early one morning, and then hung them up in the verandah. In the afternoon, when going out, she put on the gloves and was just leaving her drawing-room when she noticed the fire needed attention. She picked up the poker and stirred up the fire with the result that her gloves suddenly burst into flames. She kept her presence of mind and thrust her hands under a heavy rug, but even then she was severely burnt. Though the gloves had been hanging up for several hours, enough petrol was still absorbed in the kid to give off vapour, which got ignited by the fire. While on this subject, I would point out that the Departmental Committee on Petroleum Spirit, which issued its report on the 11th February 1913, have recommended to His Majesty's Secretary of State amongst other recommendations "that the use of petroleum spirit hair-washes in hair-dressing establishments should be prohibited, and it should be made illegal for any hair-dresser to use petroleum spirit or mixtures containing petroleum spirit on the hair of the living subject." I would also take the opportunity of drawing attention to the efficiency of asbestos sheets in stifling and extinguishing spirit fires.

Dangers of petrol.

29. During the year, enquiries were made from England as to whether there were any regulations in force in India on the subject of the manufacture, handling, and storage of celluloid. At present in India, as in England, there are no special regulations, but owing to a disastrous fire occurring with celluloid in the east end of London last year where a number of poor work girls making celluloid articles at the top of a high building could not get away and were burnt to death, the subject is receiving especial attention and I believe a Departmental Committee was appointed by the Home Office to draw up such regulations as should be found necessary. While I was at home last year, I attended some experiments carried out at St. John's Wood by the British Fire Prevention Committee with a material called "Cellit" which is an uninflammable celluloid and which gave apparently satisfactory results. So far the usual difficulty with any uninflammable celluloid has been that it has been too brittle for the manufacture of films and other articles and has frayed in storage. As far as I could judge, this difficulty has been got over with "Cellit" and I believe a company has been started to manufacture it in large quantities.

Celluloid.

30. The number of inspections done by this Department during the year is again a record one, *viz.*, 1,278 against 1,171 done the previous year. To give some idea of the work and the ground covered, I give the following details.

Number of inspections made.

During the 12 months, 1st April 1912 to March 1913, the Chief Inspector of Explosives was away from Head-Quarters on inspection duty for 172 days and travelled 24,911 miles, the two Inspectors at Calcutta and Bombay were away for 262 days and 296 days and travelled 25,790 and 24,244 miles, respectively. In conclusion I owe my grateful thanks to my Inspectors for the able assistance they have given me, and I cannot speak too highly of their services. In addition to their ordinary work they have been frequently called away in the middle of inspections to examine suspicious packages and to give evidence in court in connection with outrages.

I have the honour to be,

Sir,

Your most obedient Servant,

C. A. MUSPRATT-WILLIAMS, *Lieut.-Col., R.A.,*

Chief Inspector of Explosives in India.

APPENDIX A.

List of magazines and licenses granted under Rule 17 of the Explosives Rules for the year 1912.

Presidency or Province.	District.	Magazines.			Licenses.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Assam ...	Cachar ...	2	...	2	1	...	1
	Lakhimpur	1	...	1	1	...	1
	Total	3	...	3	2	...	2
Bengal	Burdwan	20	...	20	17	...	17
	Darjeeling	3	...	3	3	...	3
	Hooghly	4	...	4	1	...	1
	Howrah	1	...	1	1	...	1
	24-Parganas	2	...	2	1	...	1
	Total	30	...	30	23	...	23
Bihar and Orissa	Gaya ...	3	...	3	3	...	3
	Hazaribagh	12	2	14	11	2	13
	Manbhum	19	...	19	16	...	16
	Sambalpur	1	...	1	1	...	1
	Singbhum	2	...	2	1	...	1
	Total	37	2	39	32	2	34
Bombay	Ahmedabad	3	...	3	4	...	4
	Bombay	21	1	22	13	1	14
	Karachi*	5	...	5	3	...	3
	Kolaba	1	...	1	1	...	1
	Panch Mahals	1	...	1	1	...	1
	Poona ...	4	1	5	2	1	3
	Thana ...	1	...	1	1	...	1
	Total	36	2	38	25	2	27

* At Karachi there is in addition a Roburite Factory licensed under Rule 15.

Presidency or Province.	District.	Magazines.			Licenses.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Burma ...	Amherst ...	...	1	1	...	1	1
	Hanthawaddy ...	4	...	4	3	...	3
	Mandalay ...	2	...	2	1	...	1
	Mergui ...	1	...	1	1	...	1
	Pegu ...	1	...	1	1	...	1
	Ruby Mines ...	1	...	1	1	...	1
	Tavoy ...	5	1	6	3	1	4
	Thaton ...	...	2	2	...	1	1
	Total ...	14	4	18	10	3	13
Central Provinces ...	Balaghat ...	1	1	2	1	1	2
	Betul ...	2	...	2	1	...	1
	Bhandara ...	2	...	2	2	...	2
	Bilaspur ...	1	...	1	1	...	1
	Chhindwara ...	8	...	8	6	...	6
	Hoshungabad ...	...	2	2	...	1	1
	Jubbulpur ...	2	2	4	1	1	2
	Nagpur ...	4	1	5	4	1	5
	Narsinghpur ...	2	...	2	1	...	1
	Raipur ...	3	...	3	4	...	4
	Total ...	25	6	31	21	4	25
Coorg	Mercara ...	...	1	1	...	1	1
	Total ...	...	1	1	...	1	1
Madras ...	Anantapur ...	4	...	4	2	...	2
	Chingleput ...	2	...	2	2	...	2
	Kistna ...	1	...	1	1	...	1
	Madras ...	21	...	21	6	...	6
	Madura ...	1	...	1	1	...	1
	Nellore ...	6	...	6	3	...	3
	Nilgiris ...	2	...	2	1	...	1
	Salem ...	...	2	2	...	2	2
	South Arcot ...	1	...	1	1	...	1
	Tanjore ...	4	...	4	4	...	4
	Trichinopoly ...	3	1	4	3	1	4
	Vizagapatam ...	4	...	4	2	...	2
	Total ...	49	3	52	26	3	29

Presidency or Province.	District.	Magazines.			Licenses.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Punjab ...	Rawal Pindi ...	1	...	1	1	...	1
	Total ...	1	...	1	1	...	1
United Provinces ...	Garhwal ...	1	...	1	1	...	1
	Lucknow ...	1	...	1	1	...	1
	Meerut ...	1	...	1	3	...	3
	Shahjahanpur ...	1	...	1	1	...	1
	Total ...	4	...	4	6	...	6

SUMMARY.

Assam	3	...	3	2	...	2
Bengal	30	...	30	23	...	23
Bihar and Orissa	37	2	39	32	2	34
Bombay	36	2	38	25	2	27
Burma	14	4	18	10	3	13
Central Provinces	25	6	31	21	4	25
Coorg	...	1	1	...	1	1
Madras	49	3	52	26	3	29
Punjab	1	...	1	1	...	1
United Provinces	4	...	4	6	...	6
Total ...	199	18	217	146	15	161

APPENDIX B.

Summary of magazines and licenses granted under Rule 17 for the ten years ending 1912.

	Magazines.			Licenses.		
	Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
1903	129	17	146	87	14	101
1904	138	12	150	96	9	105
1905	139	15	154	95	13	108
1906	150	19	169	105	15	120
1907	164	9	173	118	8	126
1908	167	19	186	119	15	134
1909	178	29	207	128	21	149
1910	189	13	202	135	13	148
1911	190	27	217	139	19	158
1912	199	18	217	146	15	161

APPENDIX C.

Statement showing the imports of explosives by sea into British India from other countries in the year 1912.

		Bengal.	Bombay.	Sind.	Burma.	Madras.	Total.
Quantity.							
Gunpowder, black ...	lb.	70,183	152,325	27,575	92,775	42,025	384,883
„ smokeless ...	„	8,000	6,575	2,250	375	425	17,625
Ammonal	„	...	...	...	...	...	...
Dynamite	„	50,400	55,000	...	95,900	79,600	280,900
Blasting gelatine	„	13,328	16,000	...	11,000	800,000	840,328
Gelignite or gelatine dynamite	„	99,344	133,000	4,000	69,500	8,500	314,344
Monobel powder	„	...	...	...	...	...	...
Other nitro-compound explosives	„	45,910	100	672	...	177,743	224,425
Detonators	No.	765,000	484,110	12,000	222,400	2,165,500	3,649,010
Fireworks	lb.	...	2,669,021	84,018	304,248	124,124	3,181,411
Total	„	287,165	3,032,021	118,515	573,798	1,232,417	5,243,916
Total	No.	765,000	484,110	12,000	222,400	2,165,500	3,649,010
Value in rupees.							
Gunpowder, black		65,938	68,407	18,534	36,556	21,685	211,120
„ smokeless		23,274	11,928	6,171	1,355	1,480	44,208
Ammonal		...	...	...	...	...	...
Dynamite		32,208	43,525	...	91,588	62,568	229,889
Blasting gelatine		9,915	15,092	...	13,839	752,940	791,786
Gelignite or gelatine dynamite ...		63,762	105,254	3,178	67,107	6,710	246,011
Monobel powder		...	...	...	...	...	...
Other nitro-compound explosives ...		42,361	64	745	...	136,655	179,825
Detonators		9,573	12,097	330	4,970	37,755	64,725
Fireworks		137,232	630,069	48,383	89,463	37,189	942,336
Total ...		384,263	886,436	77,341	304,878	1,056,982	2,709,900

APPENDIX D.

Comparative statement showing the imports of explosives by sea into British India from other countries for the ten years ending 1912.

		1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.
Gunpowder, black	lb	272,423	473,925	202,751	168,353	170,299	256,753	213,854	242,702	229,069	384,883
„ smokeless	„	31,004	48,246	45,125½	39,745	29,317	37,615	39,412	38,176	29,611	17,625
Ammonal	„	...	...	...	...	...	250	...	...	7,800	...
Dynamite	„	416,480	149,968	249,968	352,207	262,495	350,474	453,016	360,636	389,577	280,900
Blasting gelatine	„	843,432	895,040	558,200	906,400	1,085,050	726,796	805,080	676,458	750,242	840,328
Gelignite or gelatine dynamite	„	22,096	55,048	123,048	132,594	175,040	165,208	132,032	178,968	226,034	314,344
Monobel powder	„	...	...	...	2,000	...	...	...	...	...	...
Other nitro-compound explosives	„	222,104	130,811	109,475	72,921	89,256	77,616	48,016	96,736	43,456	224,425
Detonator	No.	4,388,400	3,020,000	1,797,000	5,536,000	3,052,400	3,062,000	5,206,275	2,687,556	3,216,789	3,649,010
Fireworks	lb	1,971,317½	2,264,162	1,661,229	2,410,388	2,446,428	1,504,896	1,339,733	3,410,741	3,540,825	3,181,411
Total	lb	3,778,856½	4,017,200	2,949,796½	4,084,608	4,257,885	3,119,608	3,031,143	5,004,417	5,216,614	5,243,916
Total	No.	4,388,400	3,020,000	1,797,000	5, 536,000	3,052,400	3,062,000	5,206,275	2,687,556	3,216,789	3,649,010

APPENDIX E.

DEPARTMENT OF EXPLOSIVES.

NOTIFICATION.

Dated Simla, the 18th April 1913.

No. 640.—With reference to Notification No. 4555—4, dated the 31st May 1907, of the Government of India, Department of Commerce and Industry, publishing rules to regulate the transport and importation of explosives, the following list of "authorized explosives" referred to in Rule 9 (*1*) of the above rules, is published for general information :—

LIST OF AUTHORISED EXPLOSIVES.

The following explosives are at present authorised for importation into British India, for general sale :—

Class 1.—GUNPOWDER.

GUNPOWDER.

Class 2.—NITRATE MIXTURE.

AMMONAL.

CHILWORTH SPECIAL POWDER.

Class 3.—NITRO-COMPOUND.

Every explosive in this class and every explosive ingredient thereof shall be so thoroughly purified and otherwise of such character as to satisfy a test known as the heat test, and specified in the rule for testing explosives, published with Notification No. 4555—4, dated the 31st May 1907, referred to above.

Division 1.

ARDEER GELIGNITE.

BALLISTITE.

BLASTING GELATINE.

CAMBRITE.

CARBONITE.

CELTITE.

CHILWORTH SMOKELESS POWDER, NO. 2.

CORDITE.

CORDITE, M. D.

DYNAMITE.

FARMER'S DYNAMITE.

GELATINE DYNAMITE.

GELIGNITE.

MONOBEL POWDER.

PHŒNIX POWDER.

SAMSONITE.

Provided that every explosive in this division shall be of such character and consistency as not to be liable to liquefaction or exudation.

Division 2.

AMBERITE, NO. 2.

CHILWORTH SMOKELESS POWDER.

CHILWORTH SMOKELESS SPORTING POWDER.

E. C. SPORTING POWDER.

EMPIRE POWDER.

GUNCOTTON.

HENRITE.

IDEAL POWDER.

IMPERIAL SCHULTZE GUNPOWDER.

NEGRO POWDER.

NEONITE.

NOBEL'S SPECIAL POWDER OR IDEAL POWDER.

N. S. SMOKELESS.

PICRIC ACID.

PICRIC POWDER.
PRIMROSE SMOKELESS.
RENDITE.
ROBURITE.
RUBY POWDER.
SCHULTZE CUBE POWDER.
SCHULTZE GUNPOWDER.
SMOKELESS DIAMOND.
TONITE OR COTTON POWDER.

Class 4.—CHLORATE MIXTURE.

Nil.

Class 5.—FULMINATE.

Nil.

Class 6.—AMMUNITION.

Division 1.

NOBEL'S SAFETY ELECTRIC TIME FUZE.
PERCUSSION CAPS.
RAILWAY FOG SIGNALS.
SAFETY CARTRIDGES.
SAFETY FUZES FOR BLASTING.
SAFETY ELECTRIC FUZES.

Division 2.

CARTRIDGES FOR CANON, SHELLS, MINES, BLASTING OR OTHER LIKE PURPOSES.
CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.
CORDEAU BICKFORD.
ELECTRIC FUZES.
FILLED SHELLS.
FUZE LIGHTERS.
FUZES FOR SHELLS.
TUBES FOR FIRING EXPLOSIVES.
WAR ROCKETS.

Division 3.

CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.
DETONATORS.
ELECTRIC DETONATORS.
FRICTION TUBES.
FUZES FOR SHELLS.
NOBEL'S ELECTRIC DETONATOR TIME FUZE.
QUICK FIRING AMMUNITION.
TUBES FOR FIRING EXPLOSIVES.

Class 7.—FIREWORK.

Division 1.

Nil.

Division 2. Manufactured Fireworks.

MANUFACTURED FIREWORKS.

ALUMINIUM TORCHES.
AMORCES.
CHINESE CRACKERS.
ELECTRIC SPARKLERS.
MAGNESIUM TORCHES.
PYROTECHNIC MATCHES.
ROCKETS.
SIGNAL LIGHTS.

C. A. MUSPRATT-WILLIAMS, *Lieut.-Col., R. A.,*
Chief Inspector of Explosives in India.

APPENDIX F.

List of non-dangerous petroleum installations licensed during the year 1912.*

Province.	District.	No.
Ajmer-Merwara ...	Ajmer	4
	Total ...	4
Assam	Kamrup	1
	Lakhimpur	2
	Total ...	3
Baluchistan	Quetta	2
	Total ...	2
Bengal	Backergunge ...	1
	Bankura	1
	Bogra	3
	Birbhum	1
	Burdwan	7
	Calcutta	6
	Chittagong	5
	Darjeeling	3
	Dinajpur	3
	Howrah	3
	Jalpaiguri	2
	Khulna	1
	Midnapur	2
	Murshedabad ...	1
	Nadia	8
	Pabna	3
	Rajshaye	3
	Rangpur	6
	24-Parganas	10
	Total ...	69
Bihar and Orissa ...	Balasore	3
	Bhagulpur	5
	Champaran	4
	Cuttack	4
	Darbhanga	3
	Gaya	4
	Manbhum	4
	Monghyr	3
Bihar and Orissa—(*concld.*)	Mozufferpur	5
	Patna	5
	Purnea	6
	Ranchi	2
	Sambalpur	7
	Saran	3
	Shahabad	3
	Sontal Parganas ...	6
	Total ...	67
Bombay	Ahmedabad	5
	Ahmednagar ...	3
	Belgaum	4
	Bijapur	6
	Bombay	7
	Broach	7
	Dharwar	12
	Hyderabad (Sind) ...	1
	Karachi	6
	East Khandesh ...	4
	West Khandesh ...	6
	Nasik	6
	Poona	3
	Satara	3
	Sholapur	3
	Surat	6
	Thana	4
	Total ...	86
Burma	Hanthawaddy ...	7
	Magwe	10
	Mandalay	5
	Minbu	6
	Mingyin	2
	Pokoku	7
	Prome	3
	Thayetmyo	1
	Total ...	41

*This list includes godowns for the storage of non-dangerous petroleum regarding which this Department has cognizance.

Province.	District.	No.
Central Provinces ...	Akola	6
	Amraoti	9
	Bhandara	8
	Bilaspur	4
	Buldana	9
	Chanda	3
	Hoshangabad ...	5
	Jubbulpore	6
	Nagpur	5
	Narsingpore	3
	Nimar (Khandwa) ...	5
	Raipur	3
	Saugor	3
	Seoni	3
	Wardha	9
	Total ...	81
Hyderabad ...	Hyderabad	9
	Secunderabad ...	3
	Total ...	12
Madras	Anantapur	4
	Bellary	4
	Chingleput	7
	Coimbatore	7
	Cuddapah	2
	Ganjam	4
	Godavari	5
	Guntur	5
	Kistna	7
—	Kurnool	2
Madras—(*concld.*) ...	Madras	6
	Madura	6
	Malabar	10
	Nellore	3
	North Arcot	9
	Ramnad	4
	Salem	3
	South Arcot	13
	South Canara ...	1
	Tanjore	17
	Tinnevelly	6
	Trichinopoly	5
	Vizagapatam... ...	8
	Total ...	138
Mysore	Bangalore	10
	Total ...	10
North-West Frontier Province.	Hazara	3
	Peshawar	4
	Total ...	7
Punjab	Ambala	8
	Amritsar	4
	Delhi	5
	Gurdaspur	1
	Jullundur	3
	Lahore	6
	Ludhiana	3

Province.	District.	No.	Province.	District.	No.
Punjab—(concld.)	Multan	1	United Provinces—(concld.)	Benares	4
	Rawal Pindi	3		Cawnpur	3
	Shahpur	1		Dehra Dun	1
	Sialkot	4		Etawah	3
	Total ...	39		Fyzabad	3
				Ghazipur	1
United Provinces	Agra	4		Gonda	2
	Aligarh	2		Gorakhpur	3
	Allahabad	5		Jaunpur	1
	Azamgarh	2		Jhansi	3
	Bahraich	1		Lucknow	3
	Ballia	1		Meerut	4
	Bara Banki	3		Moradabad	3
	Bareilly	4		Muttra	1
	Basti	7		Saharanpur	4
				Shahjahanpur ...	3
				Total ...	71

SUMMARY.

	No.
Ajmer-Merwara	4
Assam	3
Baluchistan	2
Bengal	69
Bihar and Orissa	67
Bombay	86
Burma	41
Central Provinces	81
Hyderabad	12
Madras	138
Mysore	10
North-West Frontier Province	7
Punjab	39
United Provinces	71
Total ...	630

APPENDIX G.

Summary of non-dangerous petroleum installations and godowns licensed for the eight years ending 1912.

—	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.
Ajmer-Merwara	3	3	3	4	4	4	4	4
Assam	...	...	...	...	...	...	...	3
Baluchistan	...	...	1	1	1	1	2	2
Bengal	67	74	74	79	89	96	101	69
Bihar and Orissa	...	...	...	...	...	...	...	67
Bombay	65	64	76	82	79	84	83	86
Burma	10	11	13	17	19	33	35	41
Central Provinces	49	49	67	66	69	71	74	81
Eastern Bengal and Assam ...	11	14	16	21	24	31	28	...
Hyderabad	...	...	...		...	2	11	12
Madras	49	57	89	97	95	114	129	138
Mysore	...	...	...	...	8	10	10	10
North-West Frontier Province	1	3	3	3	3	3	6	7
Punjab	9	12	23	26	28	30	35	39
United Provinces	44	44	47	48	59	61	65	71
Total ...	308	331	411	444	478	540	583	630

APPENDIX H.

Statement showing the quantity of petroleum imported by sea into British India, during the eight years ending 1912.

NON-DANGEROUS PETROLEUM.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Chittagong ...	3,970,269	1,822,051	5,547,944	6,308,806	8,825,895	6,977,078	7,959,321	9,250,508
Balasore	10,000	26,200	...	...	...	...	...	...
Chandballi ...	367,500	405,000	270,200	206,150	208,200	259,000	227,400	256,800
Calcutta	27,144,014	20,342,078	27,342,923	33,379,196	26,599,239	18,642,248	27,089,471	26,468,283
Bombay	22,099,928	17,402,913	22,439,071	24,759,034	24,935,563	24,730,978	27,604,430	22,790,825
Sind	5,157,947	5,007,932	7,171,933	10,448,574	9,719,214	8,295,644	9,689,900	7,274,695
Madras	9,765,384	6,956,459	8,942,869	13,018,601	13,720,767	10,006,706	15,113,287	10,625,192
Burma	1,595,209	1,156,179	1,828,973	2,514,834	1,119,719	1,197,661	1,283,641	1,018,526
Total ..	70,110,251	53,118,812	73,543,913	90,626,195	85,148,597	70,109,315	88,967,450	77,684,829

DANGEROUS PETROLEUM.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Calcutta	14,500	...	12,270	20,048	42,965	44,708	83,800	32,080
Bombay	66,017	184,243	92,258	110,390	84,793	79,661	106,009	469,522
Sind	622	9,795	2,733	25,801	1,844	28,043	3,827	6,185
Madras	7,828	38,104	25,400	53,756	15,280	6,459	2,400	4,120
Burma	5	...	...	...	55	580	206	426
Total ...	88,972	232,142	132,661	209,995	144,937	159,451	196,233	512,333

Statement showing the quantity of petroleum produced in Burma and transported into British India, during the four years ending 1912.

	1909.	1910.	1911.	1912.
	Gallons.	Gallons.	Gallons.	Gallons.
Non-dangerous petroleum	83,299,134	85,356,057	100,758,865	100,152,787
Dangerous petroleum	648,878	922,481	1,619,527	1,392,616

Statement showing the quantity of petroleum produced in Assam and Burma, during the eight years ending 1912.

NON-DANGEROUS PETROLEUM.

—	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Assam ...	1,543,212	1,890,942	1,975,094	2,016,978	2,144,093	2,033,772	2,142,349	1,905,955
Burma ...	67,062,170	95,848,500	75,397,762	78,044,435	134,080,703	143,387,116	148,874,019	161,250,234
Total ...	68,605,382	97,739,442	77,372,856	80,061,413	136,224,796	145,420,888	151,016,368	163,156,189

DANGEROUS PETROLEUM.

—	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Assam ...	21,014	21,855	48,017	67,256	36,588	56,736	80,534	120,930
Burma ...	11,988,220	11,670,200	15,043,700	18,055,500	18,479,394	18,245,501	21,228,403	23,109,393
Total ...	12,009,234	11,692,055	15,091,717	18,122,756	18,515,982	18,302,237	21,308,937	23,230,323

APPENDIX I.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1912 to 31st December 1912.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			Explosives.			
1	18th February 1912.	Gunpowder ...	Kalianur, Salem	The District Magistrate reported that a pot containing gunpowder for adirvedis was kept within 6 yards of the firing machine, and when an adirvedi was set fire to, some sparks fell into the pot which caused an explosion fatally injuring a boy who was about 2 feet away from the gunpowder pot.	1	...
2	21st February 1912.	,, ...	Salem ...	A man was holding blasting powder in one hand and fire for lighting it in the other, when a spark fell into a pot containing powder which was close by and ignited the powder causing fatal injuries to the man.	1	...
3	2nd March 1912	,, ...	,, ...	While adirvedis containing gunpowder were being fired, it is presumed a spark fell on some powder in an earthen pot near by which caused the powder to explode and injure two men.	...	2
4	7th April 1912	,, ...	Tanjore ...	The Magistrate reported that a man was firing "adirvedis" during a religious festival. He had a lighted coir tied to a pole in his hand and kept the gunpowder in a palm leaf basket. In his hurry to thrust stones and mud into the tube, he unfortunately placed the basket of powder over the lighted coir, when an explosion occurred fatally injuring him.	1	...
5	28th April 1912	,, ...	Salem ...	An Indian after putting a charge of powder in a bore hole for blasting, placed clay on it and was striking it with an iron rod when the charge exploded fatally injuring him.	1	...
6	19th July 1912	,, ...	Madura ...	Two women were pounding hard grains of gunpowder while a third was separating the soft powder from the hard by means of a sieve. The mortar was of stone and the pestles used were of wood. The whole mass of powder suddenly exploded fatally injuring the three women. The cause of the explosion was probably due to grit in the mortar.	3	...
7	3rd September 1912.	,, ...	Tuticorin ...	An Indian was pounding country gunpowder in a stone mortar with a wooden pestle when the powder exploded owing to presence of grit. The man and a boy near by were killed. His son who was also near by was injured.	2	1
8	1st November 1912.	,, ...	Yeleswaram, Godaveri.	An Indian woman was preparing gunpowder for crackers when a spark from a cigar which another woman near by was smoking fell and caused an explosion, fatally injuring the woman preparing the powder and injuring the other one.	1	1
9	5th November 1912.	,, ...	Rajahmundry...	Four women were engaged in tying up crackers and some gunpowder was near by when all of a sudden an explosion occurred injuring the women, two of whom died. It is presumed that one of the women who went out to smoke, brought in a spark of fire in her clothes without her knowledge, which set fire to the powder.	2	2

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			Explosives—*contd.*			
10	19th December 1912.	Gunpowder ...	Salem ...	A man was engaged in firing Adirvedi. The gunpowder was deposited in iron receptacles, but as no shots were fired he applied more gunpowder in the already heated receptacle when some gunpowder in a mud pot in his hand caught fire which resulted in an explosion fatally injuring the man.	1	...
				TOTAL ...	13	6
11	8th June 1912...	Dynamite ...	Taungzun ...	While some coolies were removing rubble one of the coolies while levering a rock set off an unexploded charge which had remained unnoticed under the rock. It appears 12 blasting charges were placed in the quarry and only eleven of them exploded, the non-explosion of the 12th one being undetected.	1	11
12	9th August 1912	Gelignite ...	Khandala ...	While blasting operations were being carried on in the tunnel of the Tata Hydro Electric Works some operators started boring in old blasting holes where missfire charges remained. An explosion occurred whereby two Pathans were killed and 12 other persons injured.	2	12
13	4th September 1912.	Dynamite ...	Southern Shan States.	A Jemadar placed a charge of dynamite in a bore hole and while tamping the charge it exploded, seriously injuring the man. The explosion was probably caused by grit coming in contact with the charges.	...	1
14	2nd October 1912.	Gelignite ...	Khandala ...	About midnight an explosion took place in the tunnel being constructed by the Tata Hydro Electric Company at Khandala. The explosion was due apparently to a relief working party not being aware that a missfire cartridge had been left by the party which had just previously been working in the tunnel. When fresh drilling commenced the missfire cartridge exploded.	1	8
15	15th November 1912.	Dynamite ...	Hosur ...	While some workmen were engaged in drilling blasting holes in a cutting, one of them was killed and three injured, owing to the explosion of a charge of dynamite remaining in an unexploded hole.	1	3
				TOTAL ...	5	35
16	24th August 1912.	Detonator ...	Calcutta ...	A fireman on board ship picked up a detonator and began prodding it through with a piece of wire when it exploded causing serious injuries to his hand.	...	1
				TOTAL ...	...	1
17	21st January 1912.	Firework mixture, chlorate of potash, presumably in admixture with a sulphide.	Madura ...	An Indian was unlawfully grinding chlorate of potash and some other ingredient in his house, when an explosion occurred, fatally injuring the man.	1	...
18	25th January 1912.	Fireworks, Vengayavedis.	Tanjore ...	An Indian was bringing some fireworks made with chlorate of potash and sulphate of arsenic in his hand to the street when he slipped on the brick pavement. The fireworks exploded and the man was severely injured. He was prosecuted for being in possession of these fireworks without a license and fined.	...	1

Explosives—*concld.*

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
19	27th April 1912	Fireworks ...	Dindigul ...	The Magistrate reported that while adirvedis were being fired an Indian stood at a distance of 50 feet from the place of firing with a small basket containing 1½ lbs. of gunpowder. Sparks fell into the basket and ignited the powder, which fatally injured the man.	1	...
20	May 1912 ...	Fireworks consisting of charcoal, sulphur, saltpetre, and steel filings.	Amalapuram, Godaveri District.	The Magistrate reported that an Indian was ramming powder placed in a cloth covered with tar into the hollow of a bamboo with a wooden rod, when an explosion occurred. It is presumed the explosion was caused by the presence of grit.	...	1
21	31st May 1912	Fireworks ...	Mogulserai ...	While some railway gaugers were digging under an over bridge stairs on the Mogulserai platform a man's *phaora* struck a firework cracker concealed in the accumulation of sweepings under the bridge and exploded it, injuring 2 men. Later on another cracker was found. It is presumed these crackers were concealed by members of a wedding party travelling by train in order to avoid detection or they were left lying about the platform and swept into the rubbish.	...	2
22	2nd August 1912.	„ ...	Baliaghata ...	The Commissioner of Police, Calcutta, reported that a man placed a mixture of chlorate of potash and red sulphide of arsenic in a piece of paper and tried to wrap it tightly with rags to shape it into a small ball when it exploded causing injuries to him.	...	1
23	13th October 1912.	Firework composition consisting of chlorate of Potash and sulphide of arsenic.	Alamuru, Godaveri.	Two boys mixed the two ingredients on a wooden board and while afterwards placing the mixture into a cocoanut shell, the shell fell on the board on which there was some of the powder and this exploded at once injuring both the boys.	...	2
24	1st November 1912.	Fireworks consisting of chlorate of potash and saltpetre.	Tanjore ...	An Indian lad purchased a small quantity of the firework composition without the knowledge of his parents. The father, with the object of throwing away the packet, took it out of a box when it exploded owing, it is said, to the slight pressure exerted on it. The man's left hand was severely injured and his left eye affected.	...	1
25	3rd November 1912.	Firework, Vengayavedi, consisting of chlorate of potash and red arsenic.	Madura ...	A cooly brought home a Vengayavedi and kept it near a fire sitting close to it with his children, when it suddenly exploded causing his death and injuries to the three children.	1	3
26	3rd November 1912.	Firework composition consisting of chlorate of potash and orpiment.	Achempeta, Godaveri.	An Indian was mixing the two ingredients together in an earthen basin when an explosion occurred injuring him.	...	1
27	8th November 1912.	Firework composition consisting of potassium chlorate and realgar.	Irusumandu, Godaveri.	An Indian lad was mixing the ingredients with a pestle when an explosion occurred injuring the lad and another one who was near by.	...	2
28	11th November 1912.	Fireworks ...	Calcutta ...	Three Indians were preparing Tubris by filling earthen pots with a mixture of charcoal, powered iron, sulphur and saltpetre. While so engaged a hawai (rocket) fell over the place and some sparks from the same fell on the powder lying close by and caused an explosion fatally injuring one man.	1	2
				TOTAL ...	4	16

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			Petroleum.			
29	13th January 1912.	Kerosine ...	Bombay ...	A Hindu woman was carrying a kerosine oil lamp and let it drop, setting her clothes on fire. She was fatally burnt.	1	...
30	20th January 1912.	Oil fuel ...	Beme Reserve, Burma.	The Warden reported that a fire broke out in Receiving tank No. 3 of the British Burma Petroleum Company. The fuel tank caught fire. No damage was done to property but unfortunately the durwan in charge was so badly burned that he died. It was evident that he lighted a match to see the depth of the oil in the receiving tank.	1	...
31	24th January 1912.	Liquid fuel ...	Twingon Reserve	A fire occurred at the Indo-Burma Petroleum Company's fuel tank No. 4 and burned for about 15 minutes. In was either caused by a blow back from the boiler fed by this fuel tank or by the carelessness of the boiler man in letting the tank overflow. No damage was done to property but unfortunately the boiler man died from burns received probably in trying to extinguish his boiler when the fire started.	1	...
32	28th January 1912.	Kerosine ...	Bombay ...	A Hindu boy while playing with a lighted kerosine oil lamp accidentally set his clothes on fire, his body being severely burnt.	...	1
33	1st February 1912.	" ...	" ...	A woman was cooking her food when her sari caught fire in the flame of an open kerosine oil lamp, which was burning by her side and she was severely burnt.	...	1
34	8th February 1912.	" ...	" ...	A woman got burnt by a kerosine oil lamp accidentally setting her clothes on fire.	...	1
35	10th March 1912	" ...	" ...	The Commissioner of Police reported that a woman was sitting on the floor of a house when the chimney of a lamp fell on her and she suddenly jumped up and upset the lamp above her when the oil caught fire and set her clothes on fire. Her husband ran to her rescue and got burnt also.	...	2
36	16th March 1912	Benzine ...	" ...	An Indian had just emptied on to a table some gloves which had been soaking in benzine all night to be cleaned and was leaving the room to get more petrol when he saw a flame on the floor under the table. It is presumed the fire was caused by a cooly smoking and throwing the end of the "biddy" into the cleaning room.	...	...
37	27th March 1912.	Paraffin ...	Karachi ...	A barrel of paraffin slipped out of a sling, fell down and the end of the barrel burst, the oil running into a water tank in which 12 coolies were engaged scaling its sides. Each of the coolies had a lighted candle and the oil caught fire with the result that one European received seven burns and the 12 coolies were suffocated from the fumes.	12	1
38	28th March 1912.	Kerosine ...	Bombay ...	A Hindu girl was cooking some food seated near a naked kerosine oil lamp when her clothes accidently went over the flame of the lamp and got alight and she was severely burnt.	...	1

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			PETROLEUM—*concld.*			
39	16th April 1912	Crude petroleum.	Yenangyoung	It was reported that coolies were "pulling rods" in well No. 363 of the Burma Oil Company, when a fire broke out. The fire may have been caused by the friction between the pumping rod and the tubing in which it moves. Four men were injured, three of whom died in hospital. It was an accidental occurrence and no one can be blamed for it.	3	1
40	9th August 1912	Kerosine ...	Salem ...	A Washington light was brought for hire for the use of a drama intended to be enacted. The light reached its destination before the appointed time and an Indian who carried it placed it on the floor and was standing by its side. Another boy was also near the light looking at what was taking place. All of a sudden the light became brighter, flames arose and the kerosine oil began to trickle on the cistern, and the burner and chimney were filled with flames. Eventually the cistern burst and fell on the two Indians standing by and fatally burned them.	2	...
41	16th September 1912.	Petroleum ...	Yenangyat ...	At about 6-15 A. M. a tank containing about 120,000 gallons of oil caught fire and it was reported that it was struck by lightning, but of this there is some considerable doubt. No one was injured.	...	...
42	25th September 1912.	Petrol ...	Jalarpet ...	During transhipping operations a fire suddenly broke out in an iron railway wagon containing 375 tins of Benzine and Petrol. The fire spread to an adjoining wagon containing 40 bags of gram and rice and to some sheets and rope on the ground opposite the wagon and to a country cart standing close by. Four of the bags of gram were burnt, as well as all the sheets and rope and the country cart. The fire was presumably due to a naked light being brought near or by some one smoking in the vicinity.	...	...
43	18th October 1912.	Kerosine ...	Bankura ...	Two Indians were pouring some kerosine oil from a bottle into a lamp, presumably lighted, when the whole lot took fire and both of them were burnt, one of them succumbing to the injuries received.	1	1
44	26th October 1912.	Petrol ...	Syriam, Burma	During the loading of Petrol in the "Summer tank" ('Tween decks) of the S. S. "Conch" one drum of petrol exploded. The explosion caused no damage to the vessel or to other cargo, but it unhappily resulted in the instantaneous death of one of the coolies in the tank and caused severe injuries to five others who were taken to hospital and of these three subsequently died. The cause of the accident could not definitely be stated, but the subsequent discovery of a half-burnt native cheroot in the tank left little doubt as to the source of ignition.	4	2
45	30th November 1912.	Kerosine ...	Bombay ...	A Goanese was lighting a fire and to get it to burn quickly poured on some kerosine oil from a bottle. The fire suddenly flared up and set his clothes on fire and he was badly burnt.	...	1
				TOTAL ..	25	12

No.	Date of accident.	Nature of chemical.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons Killed.	Number of persons Injured.
				Chemicals.		
46	27th April 1912	Nitric acid ...	Central Station, Madras.	A cooly took a case of nitric acid for despatch, but as it was not properly packed he was told it could not be accepted. Instead of removing the case, the cooly disappeared. In the meantime, another cooly brought a parcel and to make room for the parcel he brought, the case of nitric acid was removed from its original place when it burst open and the cooly was slightly injured.	...	1
47	6th May 1912 ..	Nitric acid ...	Dandupur ...	A brake-van of a mail train containing betel leaves, fresh fruit, a bundle containing the faetus of an animal and also a wooden box containing nitric acid suddenly burst into flames and it is presumed the fire occurred through bottles containing the nitric acid having broken.	...	...
				TOTAL ...	...	1
				Miscellaneous.		
48	27th February 1912.	Acetylene ...	Karachi ...	The Karachi Port Trust reported that an Oxy-acetylene apparatus which had not hitherto given satisfactory results was being experimented with under the direction of an Engineer of the S. S. " Bassano " who was supposed to have expert knowledge. On the failure of the apparatus to do what was required, this officer directed the removal of the safety valve. This was done after which an explosion occurred on again working the apparatus, resulting in the death of the supervising engineer and in injuries to the Port Trust Superintendent of Machinery.	1	1
				TOTAL ...	1	1

Summary of accidents during the year 1912.

Explosives or dangerous and inflammable substances.	ACCIDENTS CAUSING LOSS OF LIFE AND BODILY INJURY. Number of accidents.	Number of persons Killed.	Number of persons Injured.	Accidents not causing loss of life or bodily injury.	Total number of accidents.
EXPLOSIVES.					
Gunpowder	10	13	6	...	10
Nitro-compounds	5	5	35	...	5
Ammunition	1	...	1	...	1
Fireworks	12	4	16	...	12
TOTAL ...	28	22	58	...	28
PETROLEUM.					
Petroleum generally	14	25	12	3	17
TOTAL ...	14	25	12	3	17
Chemicals	1	...	1	1	2
TOTAL ...	1	...	1	1	2
Miscellaneous	1	1	1	...	1
TOTAL ...	1	1	1	...	1
GRAND TOTAL ...	44	48	72	4	48

APPENDIX J.

Detailed statement showing the number of accidents and persons killed and injured during the seven years 1906 to 1912.

Year.	Gunpowder.			Dynamite and other Nitro-Compound Blasting Explosives.			Ammunition.			Fireworks.		
	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.
1906 ...	13	21	28	2	1	2	...	...	...	11	4	14
1907 ...	11	18	20	4	...	6	3	...	4	19	12	20
1908 ...	19	27	64	4	1	4	1	...	1	22	26	23
1909 ...	15	19	26	4	1	5	2	...	2	19	21	41
1910 ...	9	10	11	4	1	4	...	...	...	21	30	58
1911 ...	9	14	8	4	4	29	...	...	...	17	13	24
1912 ...	10	13	6	5	5	35	1	...	1	12	4	16
Total ...	86	122	163	27	13	85	7	...	8	121	110	196
Average ...	12	17	23	4	2	12	1	...	1	17	16	28

Year.	Petroleum.			Chemicals.			Miscellaneous.		
	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.
1906	10	9	3	...	...	...	3	1	1
1907	15	9	8	...	...	...	6	7	2
1908	41	37	6	6	...	6	5	2	8
1909	23	17	25	3	6	6	5	4	13
1910	19	29	19	2	2	1	8	5	9
1911	30	21	35	2	1	1	6	299	27
1912	17	25	12	2	...	1	1	1	1
Total ...	155	147	108	15	9	15	34	319	61
Average ...	22	21	15	2	1	2	5	45	9

APPENDIX K.

Comparative statement showing the number of accidents and persons killed and injured during the seven years 1906 to 1912.

Year.	ACCIDENTS CAUSING LOSS OF LIFE OR BODILY INJURY.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons			
		Killed.	Injured.		
1906	34	36	48	5	39
1907	50	46	60	8	58
1908	75	93	112	23	98
1909	70	68	118	1	71
1910	55	77	102	8	63
1911	64	352	124	4	68
1912	44	48	72	4	48
TOTAL ...	392	720	636	53	445
AVERAGE ...	56	103	91	8	64

APPENDIX L.

Report.

No. 78, dated the 3rd June 1912.

From—CAPTAIN J. S. RUSH, Inspector of Explosives, Bombay,

To—The Officiating Chief Inspector of Explosives with the Government of India.

I have the honour to report that in compliance with telegram No. 53, dated 28th May, from the Commissioner of Police, I proceeded to Madras to enquire into the cause of the explosion that occurred on the 25th idem in the magazine in which the merchants' explosives are stored.

2. I arrived there on the morning of the 31st May and interviewed Inspectors North and Hughes of the Madras Police.

3. Inspector North stated that Sub-Inspector Hughes, who is in charge of the magazine, is under his orders and that in the absence of Mr. Hughes he is in charge. He last visited the magazine at 8 A. M. on Monday, 20th May, when he issued some explosives to Messrs. Oakes and Company, and Messrs. P. Orr and Sons. He did not notice anything wrong at that time, except that the heat in the magazine seemed abnormal. At about 4-35 P. M. on the 25th May he was informed that the magazine was on fire, and, on arriving at the place, some ten minutes later, he heard two explosions and noticed that some of the wooden cases in the magazine were on fire. The fire was quickly extinguished by some pots of water being thrown on to it and by the steam fire engine which arrived just then. He was of the opinion that the explosion was caused by the spontaneous combustion of some of the explosives, owing to the excessive heat which had been experienced in Madras during the month of May.

4. Mr. Hughes, Sub-Inspector of the Reserve Police, stated that he was in charge of the magazine in Wall Tax Road. It is always kept locked and he keeps the key. The magazine is under a police guard of one head constable and three constables. He last visited the magazine at 7-45 A. M. on Friday, 24th May, to issue some gunpowder to Chelva Pillai Chetti. He did not then notice anything wrong except that the heat inside the magazine was abnormal. He locked up the magazine and no one entered it again before the explosion occurred, at which time the key was in his possession. He attributes the explosion to the spontaneous combustion of one of the explosives, owing to the excessive heat.

5. Constable Abdool Gaffeer mounted sentry on the magazine at 4 P. M. that day. At 4-15 he was on the earthen embankment which surrounds the building when he heard an explosion and saw the walls collapse and pieces of tins blown into the air. He ran down the embankment. Altogether he heard three explosions. After five minutes he went up the embankment again and saw a fire smouldering in one corner of the building. The door of the magazine was locked and there was no one near.

6. Constable Murugesan stated that he was on sentry when Mr. Hughes opened the magazine, and that from that time until 4 P. M. when he was relieved the door was not unlocked nor did any one approach the magazine. He was in the guard-room when the explosion occurred, and on running out he saw no one near the magazine except the sentry.

7. At 11 A. M. I proceeded to the magazine accompanied by Inspectors North and Hughes. It is situated at the north-west end of Wall Tax Road and is about 200 feet off the road, from which it is shielded by traverses of earth some 15 feet high. It is bounded on the north by a cocoanut tree tope, on the east by vacant ground, on the west by the Municipal cart depôt, and on the south by Wall Tax Road and some huts about 200 feet distant. The walls and roof are of brick and chunam and there is no wood-work about it, except the doors and windows. The main magazine measures 39′ 8″ × 14′ 9″ and there is a lobby 14′ 9″ × 6′. The building had almost entirely collapsed, the wall on the west side had fallen outwards while that on the north had fallen partly outwards and

partly inwards, those on the east and south sides were badly cracked and shaken, and the roof had fallen in. The explosion could not have been very violent, as no debris was blown about and no one injured.

8. This building has been regarded as a Government magazine in police charge. It has not been licensed, and consequently was not subject to inspection by our department. Inspector North informed me that nitro-powders stored in this magazine are not tested on arrival in India, nor were any periodical tests taken.

9. Statement A attached shows the stock of the various explosives belonging to the different firms that was in the magazine at the time when the explosion occurred. It will be noticed that amongst the nitro-powders belonging to Messrs. P. Orr and Sons are Neonite, Primrose, and Normal. These powders are not authorised for importation into British India and should not have been landed at Madras. The statement also shows the dates on which the nitro-powders were imported, from which it will be seen that the Normal powder had been stored in this magazine since August 1906. The stock belonging to Messrs. Oakes and Company was stored on the east side, that of Messrs. P. Orr and Sons in the centre, while the black powder belonging to Messrs. Chelva Pillai Chetti and Company was on the west side.

10. The tins and cases which had not exploded were mixed up with the debris, and as these were exposed to the intense heat of the midday sun, and loose powder was lying about, I gave instructions that the magazine should be flooded before any attempt was made to recover them from the ruins. The police fire engine was accordingly brought up and played on the debris for two hours or so.

11. In the meantime, I went to the business premises of Messrs. Oakes and Company and Messrs. P. Orr and Sons and took samples of the following Nitro-powders from the stock they had there.

Messrs. Oakes and Company.

AMBERITE.

DIAMOND, SMOKELESS.

BALLISTITE.

EMPIRE.

SCHULTZ, CUBE.

,, ORDINARY.

E. C. No. 3.

Messrs. P. Orr and Sons.

E. C. No. 3.

NEONITE.

DIAMOND, SMOKELESS.

PRIMROSE.

EMPIRE.

There was no stock of Normal at their shop, so I was unable to obtain a sample of this powder. I took these twelve samples to the Chemical Analyser, Madras, who tested them in accordance with the regulations, and informed me that they had passed.

12. At 5 P. M., I returned to the magazine where I was met by Mr. Parankusam Naidu, Deputy Commissioner, Northern Circle. The debris and powder had been thoroughly flooded with water and I gave instructions to the police officers to remove the debris and recover what remained of the explosives, packages, etc. Those that were recovered were stored for the night in an empty guard-room under police guard, but as this place was not large enough to sort out the different descriptions of powder, the police pitched a double fly tent on Saturday in an

isolated position and the explosives were removed there from the guard-room, while others were brought there as they were recovered from the debris. On account of the precautions that had to be taken in removing the debris it necessarily took a long time, and this work was not finished until 6 P. M. on Saturday. Before starting work on Saturday morning, I had the place again saturated with water.

13. Statement B attached gives the quantities of the various descriptions of explosives that were recovered. A comparison of these figures with those in statement A, shows that the following explosives were destroyed by the explosion :—

Messrs. Oakes and Company.

Nil.

Messrs. P. Orr and Sons.

	lb.
E. C., No. 3	55
NEONITE	25
PRIMROSE	1
EMPIRE	30
NORMAL	55
CURTIS AND HARVEY'S No. 6 (BLACK POWDER)	42
CURTIS AND HARVEY'S FFF (BLACK POWDER)	5

It will be noticed that 39 lb. of smokeless diamond in 1 lb. tins belonging to Messrs. P. Orr and Sons were recovered, whereas this firm had only 26 lb. on their books.

Messrs. Chelva Pillai Chetti and Company.

	lb.
BLACK POWDER, 4 25 lb. BARRELS	100
„ „ IN FLASKS	49½

making a total of 362½ lb. of explosives

14. The portions of the stock bel onging to Messrs. P. Orr and Sons and Messrs. Chelva Pillai Chetti and Company that were recovered were thrown by the shock of the explosion on to those of Messrs. Oakes and Company, and I attribute the salving of these explosives and those of Messrs. Oakes and Company to the prompt action of Inspector J. W. North and those under his command in playing water on the pile of burning cases until the fire was extinguished. This doubtless prevented a further explosion and possible damage to life and property.

15. After carefully considering all the evidence and points in the case, I am of the opinion that the explosion was due to the spontaneous combustion of the Normal powder belonging to Messrs. P. Orr and Sons which is not authorised for importation into British India and which had been stored in this magazine for nearly six years without being tested. None of this powder was left. It will be noted that the explosion occurred at 4-15 P. M. when the temperature inside the magazine would be at its highest. The fire was evidently communicated to some of the other Nitro powders stored in the same stack as the Normal powder, and also to the 100 lb. of black powder belonging to Messrs. Chelva Pillai Chetti and Company, which was packed in four barrels and stored near the west wall of the magazine. These exploded and blew down this and the north wall, causing the roof to fall.

16. The powders which were salved are at present stored in a double fly tent under police guard, as I did not consider it advisable, after they had been subjected to such extreme heat, that they should be removed without being

tested to the magazines at Korukupett, where temporary arrangements have been made by the Commissioner of Police with Messrs. Best and Company to store the merchants' powder.

17. I gave instructions that the stock of Neonite and Primrose at present in the shop of Messrs. P. Orr and Sons should be removed to the tent and that three samples of each Nitro powder, except these two should be taken from different tins and sent to the Chemical Analyser for test. If they are satisfactory, the stock of these powders might be stored in the magazine and issued to the merchants as required. The flasks of black powder might be removed to the magazine without test.

18. Two photographs of the magazine taken after the explosion are herewith attached.

19. I would make the following recommendations :—

(*a*) That steps should be taken to prevent any explosives, except those which are authorised for importation into British India, from being landed at Madras.

(*b*) That immediately on the importation of Nitro powders, samples should be taken and forwarded to the Chemical Analyser for test in accordance with regulations.

(*c*) That samples of all Nitro powders should be tested at least twice a year, as soon after the 1st April and 1st October as possible.

(*d*) That some system be adopted at once to prevent the new stock of any one description of powder being issued from the magazine, until the old stock of that powder is exhausted.

(*e*) That a maximum and minimum thermometer be kept in the magazine and the temperature recorded in a book.

(*f*) That when the new magazine is built, it should be provided with an outer shed to protect it from the direct rays of the sun.

(*g*) That the stock of Neonite and Primrose powders be destroyed, by being emptied from the tins into deep sea water.

STATEMENT A.

Showing the description and quantity of explosives in the magazine at the time of the explosion, compiled from the books of the Firms.

Explosives.	Oakes & Co.	P. Orr & Sons.	Chelva Pillai Chetti & Co.	Manufacturers.	Date of importation.	Remarks.
	lb.	lb.	lb.			
Nitro Powders.						
Amberite	15	...	...	Curtis and Harvey.	4th September 1911.	
Diamond, smokeless	45	26	...	Ditto ...	4th September 1911.	
Ballistite	25	...	...	Nobel ...	23rd October 1911.	
Empire	40	30	...	Do. ...	4th September 1911, and 23rd October 1911.	
Schultz, cube	40	...	...	...	4th September 1911.	
„ ordinary	110	...	...	...	4th September 1911.	
E. C., No. 3	67	105	...	E. C. Powder Co.	4th September 1911.	
Neonite	...	50	...	New Explosive Co.	4th September 1911.	These powders are not authorised for importation into British India.
Primrose	...	1	...	Ditto ...	4th September 1911.	
Normal	...	55	...	Normal Powder and Ammunition Co.	August 1906 ...	
Black Powder.						
F. F. F.	68	102	...	Curtis and Harvey.	...	
No. 4	65	...	...	Ditto ...	...	
No. 6	50	42	...	Ditto ...	...	
4 barrels (probably English blasting powder).	...	...	100	...	...	
2 and a piece case containing sporting powder in flasks.	...	...	53	Chilworth ...	...	

STATEMENT B.

Showing the description and quantities of explosives recovered from the magazine after the explosion.

Explosives.	Oakes & Co.	P. Orr & Sons.	Chelva Pillai Chetti & Co.
Nitro Powder.	lb.	lb.	
Amberite	15	...	...
Diamond, smokeless	45	39	...
Ballistite	25	...	...
Empire	40	...	...
Schultz, cube	40	...	...
„ ordinary	110	...	...
E. C., No. 3	67	50	...
Neonite	...	25	...
Primrose	...	...	...
Normal	...	...	...
Black Powder.			
F. F. F.	68	97	...
No. 4	65	...	...
No. 6	50	...	...
4 barrels, probably English blasting powder	...	...	...
2 and a piece case containing sporting powder in flasks ...	...	...	3½

APPENDIX M.

Rules for blasting.

I. The jamadar in charge hereafter mentioned as the jamadar must show that he is thoroughly acquainted with all blasting operations, that he understands the rules herewith laid down and that he will be held responsible for any accident that may occur.

II. Bore holes must be of such a size that the cartridge can easily pass down them.

III. The position of all holes to be drilled must be marked out with white paint thus ⊙ and the jamadar must take particular note of these positions.

IV. The drilling operations being finished, the jamadar must make a second inspection and satisfy himself that the bore holes marked out by him have been drilled.

V. The jamadar himself must prepare all charges necessary for the bore holes.

VI. Only ten holes may be loaded and fired at one time, and the charges should be fired, as far as practicable, successively and not simultaneously. Bore holes must be cleared of all debris before a cartridge is inserted.

The loading is to be done by the jamadar himself and the position of the charge holes carefully noted. Wooden tamping rods only to be used in charging holes (not pointed but cylindrical throughout) ; one cartridge at a time must be inserted and gently pressed home with the tamping rod.

VII. Immediately before firing a blast, due warning must be given and the jamadar must see that all the coolies have retired to safety.

VIII. The safety fuses of the ten charged holes are to be lighted in presence of the jamadar who must see that the fuses of the ten holes charged have properly ignited.

IX. Careful count must be kept by the jamadar and others of each blast as it explodes.

X. After the blast, the jamadar must carefully inspect the work and satisfy himself that all ten holes have exploded.

XI. In case of a miss-fired hole, the jamadar must first examine the same and at once mark a red cross over the hole thus ⊗

XII. None of the drillers are to work near this hole until one of the two following operations has been done by the jamadar.

XIII. Either the jamadar should very carefully (when the tamping is of damp clay) extract the tamping with a wooden scraper and withdraw the fuse with primer and detonator attached, after which a fresh primer and detonator with fuse should be placed in the miss-fired hole and fired.

Or the hole may be cleared of one foot of tamping, and the direction then be ascertained by placing a stick in the miss-fire hole. Another hole may then be drilled 6″ from the miss-fired hole and parallel to it, this hole to be then charged and fired, when the miss-fired hole should explode at the same time.

XIV. Before leaving his work, the jamadar should inform the jamadar of the next shift relieving him of any case of miss-fire and should point out the position of the red cross denoting same, also stating what action, if any, he has taken in the matter.

XV. The jamadar should also at once report at the office all cases of miss-fire, the cause of same, and what steps were taken in connection therewith.

XVI. The jamadar's name at night and day shift must be sent in daily to the office.

XVII. If practicable, no one should approach a miss-fire for at least half an hour.

Precautions against miss-fire.

1. The safety fuse should be cut in an oblique direction.

2. All saw-dust must be cleared from the inside of the detonator, this can be done by blowing down the detonator and tapping the open end. No instrument must be inserted into the detonator for this purpose.

3. After inserting the fuse in the detonator, it should be fixed by means of the nippers.

4. If there is water present, or if the bore hole be damp, the junction of the fuse and detonator must be made water-tight by means of tough grease, or other suitable material.

5. The detonator should be inserted into the cartridge, so that about one-third of the copper tube is left exposed outside the explosive. The safety fuse just above the detonator should be securely tied in position in the cartridge. Water-proof fuse only to be used in damp bore holes, or when water is present in the bore hole.

6. If a miss-fire has been found to be due to defective fuse, detonators or dynamite, the whole quantity or box from which the defective article was taken must be returned to the office for inspection.

3CIE—680—22-5-13—GCBP Simla

Indian Explosives Act (IV of 1884)
Indian Petroleum Act (VIII of 1899)

FIFTEENTH ANNUAL REPORT

OF THE

Chief Inspector of Explosives in India

BEING HIS ANNUAL REPORT FOR THE YEAR ENDING 31st MARCH 1914

CALCUTTA
SUPERINTENDENT GOVERNMENT PRINTING, INDIA
1914

Fifteenth Annual Report of the Chief Inspector of Explosives in India.

No. 1080.

FROM

LIEUT.-COLONEL C. A. MUSPRATT-WILLIAMS, R. A.,
Chief Inspector of Explosives in India,

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,
DEPARTMENT OF COMMERCE AND INDUSTRY.

Simla, the 15th June 1914.

SIR,

I have the honour to submit herewith a report of the work of my Department during the year ending 31st March 1914.

Personnel.

2. Captain J. S. Rush, Inspector of Explosives, was granted eight months' combined leave, with effect from 12th March 1913, and Conductor J. H. Allen, from the Cordite Factory, Aruvankadu, has been appointed to officiate.

Number of magazines.

3. During the year 1913, 172 licenses (eleven more than in the previous year) were granted in British India under Rule 17 of the rules to regulate the manufacture, possession and sale of explosives. The number of magazines licensed was 235 or eighteen more than in 1912, and is in excess of the number of licenses granted, because in a number of cases firms have two or more magazines in one place under one license. A statement showing the number and location of the magazines and also the number of licenses granted in British India during the year 1913 is given in Appendix A, and a statement showing the number of magazines and licenses granted during the past ten years is shown in Appendix B.

Inspection of explosives magazines during the year.

4. During the year, 334 inspections of magazines were made; a number of magazines being inspected two or three times. Those magazines are inspected most frequently which are situated in the neighbourhood of towns or in populous localities, or which contain large quantities of explosives, or any explosive, which on account of its greater susceptibility to decomposition and consequent ignition, it is considered advisable to examine and test more frequently than other explosives. The Roburite Factory at Karachi was also inspected.

Condition of magazines.

5. The magazines generally are in good order, and as usual magazine owners have been found most willing to carry out recommendations even when involving considerable expense, and my thanks are due to them for making my duties easy in this respect.

Condition of explosives in magazines.

6. The year under reference has been a most unfortunate one with respect to the physical condition of high explosives in magazines and holds two unenviable records, in that never before in my experience of nearly sixteen years in my present appointment has such a large quantity of high explosives had to be destroyed owing to its dangerous state and never before have quite recently manufactured high explosives shown signs of deterioration almost directly after importation. During July 1913 I examined in one of the magazines at Madras a consignment of blasting gelatine manufactured in February and March 1913 and imported in May 1913 and found a number of cartridges exuding nitro-glycerine in the boxes which I opened. In the hope that the exudation might not be general and that some of the stock might be able to be saved, I ordered Captain J. S. Rush, Inspector of Explosives, to proceed to Madras to examine the whole stock, case by case, and to separate, if possible, the good cartridges from the bad. After the examination had proceeded for some time, it was found that such a large proportion of the cartridges were exuding badly and also that the examination of the cartridges was in itself such a dangerous operation owing to the large amount of free nitro-glycerine and also to the fact that the operations had to be conducted in hot weather in a tent with unskilled cooly labour that I felt there was no alternative but to recommend the destruction of the blasting gelatine instead of taking any further risks. One hundred and sixty-four cases of 50 lbs. each, that is, 8,200 lbs. in all, were accordingly destroyed by drowning in the sea. Some blasting gelatine of 1912 manufacture in the same magazine was found to be in perfectly good condition.

In January last at the Port Trust Magazine, Rangoon, I examined a number of cases of gelignite out of a consignment of 270 cases of 50 lbs. which had been about two years in the country, and I found the cartridges in all the boxes exuding very badly, so much so that free nitro-glycerine was all over the cartridge wrappers and card board boxes or packets containing the cartridges. I considered the gelignite was in an extremely dangerous state and recommended its destruction, which was duly carried out by drowning in the sea. Thirteen thousand five hundred pounds in all was destroyed.

In Bombay in February last I examined a number of cases out of a consignment of 750 cases of a special large size dynamite (cartridges 14″ long 2″ diameter and each 2½ lbs. weight) which had been especially ordered by the Bombay Port Trust for use in connection with their Harbour Works. The dynamite had been manufactured in 1913 and had only recently been imported. I found a large proportion of cartridges were exuding, some slightly, some very badly. As this dynamite was urgently required for use by the Port Trust for submarine mining, and as owing to the size of the cartridges, examination as to their state and separation into good and bad lots was more easily carried out than would be the case of the ordinary small cartridges which roughly run eight to a pound, I consented to the cartridges being all examined, the badly exuding ones destroyed, and the slightly exuding ones wiped and with any good cartridges repacked with 3 thickness of parchment paper. I saw some of these repacked cartridges charged in the long tin cylinders used by the Port Trust in connection with their blasting operations and considered that with the taking of all proper precautions they might be used without any undue risk provided no further exudation took place, in which latter case I stated that I considered no further risk should be taken and that the dynamite would have to be destroyed. I ordered my Inspector, Captain J. S. Rush, to make a further examination of the repacked cartridges at an early date about the first week in March, which he did, and found a large number of the rewrapped cartridges exuding badly. Consequently, I recommended the whole stock remaining to be destroyed by drowning in the sea. During the first examination before repacking 120 cases or 6,000 lbs. had to be destroyed, and finally after repacking, 504 cases or 25,200 lbs. had to be destroyed, making a total in all of 31,200 lbs. This is the first time in my experience that I have ever found exudation with dynamite except when it had been in contact with water.

Exudation of this sort with dynamite is due usually to the use of an insufficient quantity of absorbent (Kieselguhr) to hold the nitro-glycerine or to the poor quality of the absorbent, but in this case it is just possible that

the unusual size and weight of the cartridges may have had some effect in causing the exudation, if there was the same proportion of nitro-glycerine in these cartridges as in the ordinary small cartridges of dynamite which, I believe, was the case. These large cartridges were packed tightly together, four in a card board box or packet, and there were five of these packets in a case and the weight and pressure of the cartridges on one another may have helped to force out the nitro-glycerine. Ordinarily the proportion of nitro-glycerine in dynamite is about 75 per cent., but in these large cartridges I am of opinion it would probably be better to reduce the proportion to about 60 per cent.

In addition to the defective explosives referred to above, the following explosives were found to have deteriorated or have become defective and were destroyed :—

(*a*) 60 coils defective fuze at Messrs. F. F. Christien & Co.'s magazine at Domchanch.

(*b*) 2 tins of Ammonal No. 5 cartridges at Messrs. Dymes & Co.'s magazine at Madras.

(*c*) 300 loaded cartridges at Messrs. Hafiz Ghouse & Co.'s magazine at Meerut.

(*d*) 39 cartridges dynamite at the East Indian Railway Co.'s magazine at Jakhim.

(*e*) 88 electric detonators at the Indian Granite Co.'s magazine at Pallaveram.

(*f*) 255 detonators at the Barakar Coal Co.'s magazine at Loyabad.

(*g*) 6 cases containing 36 gross electric sparklers at Messrs. C. Abboy Chetty & Son's magazine at Tandiarpet.

(*h*) 5 cases of fireworks at Messrs. C. Abboy Chetty & Son's magazine at Tandiarpet.

(*i*) 15¾ coils of safety fuze at the Sitarampur Coal Co.'s magazine at Kalikapur.

(*j*) About 50lbs. gunpowder at Messrs. Hoare Miller & Co.'s magazine at Bhaga.

(*k*) 37lbs. of dynamite at Messrs. Finlay Fleming & Co.'s magazine at Myohaung. This was not borne on the stock list of the firm, but was being stored for a Chinaman who is said to have failed and to have returned his stock of dynamite for safe storage. While in his possession it had probably been stored under unfavourable conditions.

Thefts.

7. During the year under report two thefts of explosives were reported to this office.

(*a*) 223 cartridges of dynamite and 100 electric detonators were stolen on the 20th March 1913, from the licensed premises attached to Roy's Suretur Colliery.

(*b*) 33lbs. of gunpowder were stolen from the Darjeeling Municipality Magazine between the 18th and 20th October 1913.

Import of explosives.

8. Two thousand one hundred and sixty-four tons of explosives were imported into British India during the year 1913, the value being Rs. 25,85,151. Full details showing the different kinds of explosives imported, and the value of each are given in Appendix C. From this Appendix it will be seen that though the value of fireworks imported into Bengal is given, the quantity imported is not shown, as the Collector of Customs states that the quantity imported is not recorded in his office. A comparative statement showing the quantity of explosives imported during the last ten years is given in Appendix D.

Authorised explosives.

9. A list of explosives at present authorised for importation into British India for general sale has been published in the *Gazette of India*, for information. This list will be found in Appendix E.

10. The draft consolidated rules for the manufacture, possession, sale, transport, and importation of explosives were published for criticism by the Government of India on 13th April 1912, and have recently been issued finally. They are a great improvement on the old rules which were issued in two parts, one dealing with manufacture, possession, and sale, and the other with transport and importation. In the new rules a great deal of superfluous matter which was common to both sets of rules has been removed, and the rules have been brought up to present requirements and well indexed.

Explosives Rules.

Petroleum.

11. During the year under report, 668 licenses for the storage of non-dangerous petroleum, regarding which this department was concerned or consulted, were granted. This is an increase of 38 as compared with last year. A list of these installations, corrected up to 31st December 1913, and showing the districts in which they are located, is given in Appendix F, and a statement showing the number of licenses granted during the past nine years, is given in Appendix G. In addition to the number of licenses shown in Appendix F, there are, of course, a very large number of storage godowns for the possession of non-dangerous petroleum in non-bulk, licensed by District Officers, of which this department has no cognizance.

Number of petroleum installations.

12. There are also a number of godowns licensed for the storage of dangerous petroleum in non-bulk throughout the country, and the Inspector of Explosives and I have inspected a number of these, when their existence has been brought to our notice, or where they are near non-dangerous petroleum installations or contain more than 500 gallons of petrol.

Dangerous petroleum godowns.

13. During the year the Chief Inspector of Explosives personally visited the large bulk oil installations at Madras, Bombay, Karachi, Calcutta, (Budge Budge and Narculdanga), Chittagong, and Rangoon, and also the oil fields of Burma and Assam. He in addition inspected a number of minor installations. In all 720 inspections of non-dangerous petroleum premises were made. One hundred and seventy-nine inspections of dangerous petroleum godowns were also made by this department.

Inspection of petroleum installations during the year.

14. The large petroleum installations are usually under efficient European supervision, and are in good order and well looked after.

Condition of major installations.

15. The small or minor petroleum installations are installations in which not more than 50,000 gallons of kerosene oil in combined bulk and non-bulk are stored, and are looked after by Indian Agents, employed by the large oil firms. The oil for these installations is supplied from the major installations at the different ports, and the retail trade is carried out in them. A great deal of inspection of these minor installations has been done by this Department during the last eight years, with the result that their condition is very much improved and the generality of them are in very good order. As a matter of fact when an installation is found not up to the mark at an inspection, it is usually due to the fact that some new Agent has been recently appointed who has not realised what is required of him. The oil companies do not hesitate to change their agents if several unsatisfactory reports are made of the installations under their charge.

Condition of minor installations.

16. During the year 1913, 109,167,055 gallons of non-dangerous petroleum and 781,829 gallons of dangerous petroleum were imported by sea into British India. The details are given in Appendix H and also the quantity of non-dangerous and dangerous petroleum produced in Assam and Burma during the year, as well as during the past nine years. It will be noticed that there is a great advance in the imports of dangerous petroleum.

Import of petroleum.

Accidents.

17. A list of accidents, with a short account of each, that have occurred with explosives, inflammable substances, dangerous goods, etc., between the 1st January and 31st December 1913, and that have been reported to this Department is given in Appendix I. It will be seen from a perusal of the details that the accidents have practically all been caused by gross neglect of ordinary precautions. In all there were 47 accidents causing 47 deaths and injuries to 75 persons. Comparative statements given in Appendices J and K show the total number of accidents and the number of persons killed or injured by them during the last eight years. As stated in previous reports, it is very doubtful whether all accidents that occur are duly reported to this Department and, therefore, it is very possible that the statistics given are underestimated. I notice that in some parts of India accidents appear more prevalent than in others; but I am inclined to think that such difference may be occasioned by the local authorities in some places being more careful in carrying out instructions to report accidents than they are in others.

Number of accidents.

18. There were fifteen accidents from gunpower during the year, causing twelve deaths and injuries to twenty-five persons.

Gunpowder, Class I.

19. Nitro-Compounds were responsible for three accidents, from which two persons were killed and one injured.

Nitro-Compounds, Class III.

Ammunition, Class VI.

20. One accident from ammunition (detonator) caused injuries to one person.

21. Fourteen accidents from fireworks caused the death of fourteen persons, and injuries to twenty-six others. It will be noticed from the details of the accidents that a number of these were caused by Sulphur Chlorate mixtures, the use of which is now prohibited, and as stated in my last report, if this prohibition is strictly enforced, there is no doubt the number of accidents from fireworks will be considerably reduced.

Fireworks, Class VII.

22. There were twelve accidents from petroleum during the year, which were responsible for nineteen deaths and injuries to nineteen persons. It will be seen from a perusal of the accidents in Appendix I, that carelessness is a prominent feature in most of them. In India the petroleum accidents are caused usually by lights being brought into proximity to oil vapour, to kerosene lamps being upset or falling down and to kerosene being poured on to fires or into lighted lamps.

Petroleum.

While I was touring in the Punjab in November last I saw in the papers an account of a terrible disaster at Tuticorin, on board the Burma Oil Company's Oil Tanker S. S. *Twingone*, in which a number of lives were lost. As my Inspector was at Bombay and nearer the scene of accident, I wired to him to proceed to Tuticorin at once and hold an enquiry. His report to me is given in Appendix L. I agree with him that most probably the accident was caused by carelessness on the part of one of the coolies in striking a match, and I am strengthened in my opinion by the fact that some years ago there were several bad fires causing loss of life on board barges conveying petrol from oil steamers to shore in Bombay Harbour and that these accidents have stopped since European supervision has been insisted on these barges. Three precautions seem very necessary from the accident, and they are that awnings should be furled on board oil steamers when discharging or taking on board petrol, that no lighter used for carrying petrol should be permitted to carry a caboose for cooking purposes, and that European supervision on board the lighters should be a *sine qua non*.

A very similar accident occurred on board the Burma Oil Company's Oil Tanker S. S. *Singu* at Cochin on the 29th November 1913, but was attended with less disastrous consequences, *vide* item 45 in Appendix I.

Chemicals.

23. There were no accidents from chemicals reported during the year.

24. Two accidents from miscellaneous dangerous articles and substances were responsible for injuries to three persons.

Miscellaneous accidents.

25. One accident was reported to this Department, whereby one person was killed and three injured. The accident was due to reloading a blast hole in which a charge had failed to fire.

Government accidents.

General Remarks.

26. As mentioned in paragraph 27 of my last year's report in some Government magazines in charge of civil officers there was found to be a lack of proper supervision and ignorance of the conditions in which a magazine should be kept, in consequence of which accidents had occurred, and the question of bringing these magazines under the jurisdiction of this Department has been under the consideration of the Government of India, and it has been decided that these magazines will be inspected by the officers concerned, a copy of their reports on a special form being sent to this office in order that advice may be given on any irregularities that may be noticed.

Government magazines in charge of civil officers.

27. The number of inspections done by this Department during the year were 1,233. To give some idea of the work and the ground covered, I give the following details.

Number of inspections made.

During the 12 months, 1st April 1913 to March 1914, the Chief Inspectors of Explosives was away from Head-Quarters on inspection duty for 169 days, and travelled 26,326 miles, the two Inspectors at Calcutta and Bombay were away for 214 days and 276 days and travelled 28,487 and 27,362 miles, respectively.

Our actual inspection work was somewhat interfered with during the year under the following circumstances. Captain Rush was employed for about a fortnight in examining doubtful blasting gelatine in Madras and also was engaged for some considerable time at Tuticorin in holding an enquiry on the *Twingone* disaster. Major Turner and I were several times recalled from remote places to give evidence in Court, and sometimes on arrival found the case postponed, and consequently could not make any arrangements for touring till we had given evidence. The Police Officers in charge of cases have invariably done their best to help us, but cannot always foresee unexpected developments.

28. In conclusion, I owe my grateful thanks to my Inspectors for the able assistance they have given me, and I cannot speak too highly of their services.

I have the honour to be,

SIR,

Your most obedient Servant,

C. A. MUSPRATT-WILLIAMS, *Lieut.-Col., R. A.*,
Chief Inspector of Explosives in India.

APPENDIX A.

List of Magazines and Licenses granted under Rule 17 of the Explosives Rules for the year 1913.

Presidency or Province.	District.	Magazines.			Licenses.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Assam	Cachar	2	...	2	1	...	1
	Lakhimpur	1	...	1	1	...	1
	Total	3	...	3	2	...	2
Bengal	Bankura	...	2	2	...	1	1
	Burdwan	20	...	20	17	...	17
	Darjeeling	3	...	3	3	...	3
	Hooghly	4	...	4	1	...	1
	Howrah	1	...	1	1	...	1
	24-Parganas	2	...	2	1	...	1
	Total	30	2	32	23	1	24
Bihar and Orissa	Gaya	3	...	3	3	...	3
	Hazaribagh	14	...	14	11	...	11
	Manbhum	19	2	21	16	1	17
	Sambalpur	1	...	1	1	...	1
	Singbhum	2	1	3	1	1	2
	Total	39	3	42	32	2	34
Bombay	Ahmedabad	4	...	4	4	...	4
	Bombay	21	...	21	13	...	13
	Karachi*	5	...	5	3	...	3
	Kolaba	1	...	1	1	...	1
	Panch Mahals	1	1	2	1	1	2
	Poona	5	3	8	3	3	6
	Thana	1	3	4	1	2	3
	Total	38	7	45	26	6	32
Burma	Bassein	...	1	1	...	1	1
	Hanthawaddy	4	...	4	3	...	3
	Mandalay	2	...	2	1	...	1
	Mergui	1	...	1	1	...	1
	Pegu	1	...	1	1	...	1
	Ruby Mines	1	...	1	1	...	1
	Tavoy	8	2	10	5	1	6
	Thaton	2	...	2	1	...	1
	Total	19	3	22	13	2	15

* At Karachi there is in addition a Roburite Factory licensed under Rule 15.

APPENDIX A—*contd.*

List of Magazines and Licenses granted under Rule 17 of the Explosives rules for the year 1913—*contd.*

Presidency or Province.	District.	Magazines.			Licenses.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Central Provinces	Balaghat	2	...	2	2	...	2
	Betul	2	...	2	1	...	1
	Bhandara	2	...	2	2	...	2
	Bilaspur	1	...	1	1	...	1
	Chanda	...	1	1	...	1	1
	Chhindwara	6	...	6	4	...	4
	Jubbulpur	4	...	4	2	...	2
	Nagpur	5	1	6	5	1	6
	Narsingpur	2	...	2	1	...	1
	Raipur	3	...	3	4	...	4
	Total	27	2	29	22	2	24
Coorg	Mercara	1	...	1	1	...	1
	Total	1	...	1	1	...	1
Madras	Anantapur	4	2	6	2	2	4
	Chingleput	2	...	2	2	...	2
	Madras	21	1	22	6	1	7
	Madura	1	...	1	1	...	1
	Nellore	6	...	6	3	...	3
	North Arcot	...	1	1	...	1	1
	Nilgiris	2	...	2	1	...	1
	Salem	...	1	1	...	1	1
	South Arcot	1	...	1	1	...	1
	Tanjore	4	3	7	4	3	7
	Trichinopoly	4	...	4	4	...	4
	Vizagapatam	4	...	4	2	...	2
	Total	49	8	57	26	8	34
Punjab	Rawal Pindi	1	...	1	1	...	1
	Total	1	...	1	1	...	1
United Provinces	Lucknow	1	...	1	1	...	1
	Meerut	1	...	1	3	...	3
	Shahjehanpur	1	...	1	1	...	1
	Total	3	...	3	5	...	5

SUMMARY.

Presidency or Province.	Magazines.			Licenses.		
	Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Assam	3	...	3	2	...	2
Bengal	30	2	32	23	1	24
Bihar and Orissa	39	3	42	32	2	34
Bombay	38	7	45	26	6	32
Burma	19	3	22	13	2	15
Central Provinces	27	2	29	22	2	24
Coorg	1	...	1	1	...	1
Madras	49	8	57	26	8	34
Punjab	1	...	1	1	...	1
United Provinces	3	...	3	5	...	5
Total	210	25	235	151	21	172

APPENDIX B.

Summary of magazines and licenses granted under Rule 17 for the ten years ending 1913.

	Magazines.			Licenses.		
	Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
1904	138	12	150	96	9	105
1905	139	15	154	95	13	108
1906	150	19	169	105	15	120
1907	164	9	173	118	8	126
1908	167	19	186	119	15	134
1909	178	29	207	128	21	149
1910	189	13	202	135	13	148
1911	190	27	217	139	19	158
1912	199	18	217	146	15	161
1913	210	25	235	151	21	172

APPENDIX C.

Statement showing the imports of explosives by sea into British India from other countries in the year 1913.

		Bengal.	Bombay.	Sind.	Burma.	Madras.	Total.
Quantity.							
Gunpowder, black	lb.	64,635	64,903	47,450	14,600	22,125	213,713
„ smokeless	„	11,390	7,550	2,025	...	505	21,470
Dynamite	„	144,256	85,050	10,000	82,000	110,000	431,306
Blasting gelatine	„	47,824	16,000	1,000	23,250	762,550	850,624
Gelignite or gelatine dynamite	„	6,048	150,000	9,000	32,000	65,500	262,548
Other nitro-compound explosives	„	109,088	...	...	...	168,704	277,792
Detonators	No.	1,033,500	864,200	100,000	319,000	3,612,150	5,928,850
Fireworks	lb.	...	1,776,476	52,113	429,290	12,990	2,270,869
Total	„	383,241	2,099,979	121,588	581,140	1,142,374	4,328,322
Total	No.	1,033,500	864,200	100,000	319,000	3,612,150	5,928,850
Value in rupees.							
Gunpowder, black		65,882	31,117	29,357	5,343	13,215	144,914
„ smokeless		27,848	14,839	5,781	...	1,617	50,085
Dynamite		104,935	67,446	7,942	79,125	86,290	345,738
Blasting gelatine		38,252	15,092	946	28,406	718,543	801,239
Gelignite or gelatine dynamite		5,592	118,710	7,148	30,905	51,860	214,215
Other nitro-compound explosives		69,144	...	...	...	138,867	208,011
Detonators		39,894	15,140	1,555	9,925	56,887	123,401
Fireworks		123,900	416,155	18,371	130,738	8,384	697,548
Total		475,447	678,499	71,100	284,442	1,075,663	2,585,151

APPENDIX D.

Comparative statement showing the imports of explosives by sea into British India from other countries for the ten years ending 1913.

		1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
Gunpowder, black	lb.	473,925	202,751	168,353	170,299	256,753	213,854	242,702	229,069	384,883	213,713
„ smokeless	„	48,246	45,125½	39,745	20,317	37,615	39,412	38,176	29,611	17,625	21,470
Ammonal	„	...	...	...	...	250	...	...	7,800	...	...
Dynamite	„	149,968	249,968	352,207	262,495	350,474	453,016	360,636	389,577	280,900	431,306
Blasting gelatine	„	895,040	558,200	906,400	1,085,050	726,796	805,080	676,458	750,242	840,328	850,624
Gelignite or gelatine dynamite	„	55,048	123,048	132,594	175,040	165,208	132,032	178,968	226,034	314,344	262,548
Monobel powder	„	...	...	2,000	...	...	...	...	...	...	...
Other nitro-compound explosives	„	130,811	109,475	72,921	89,256	77,616	48,016	96,736	43,456	224,425	277,792
Detonators	No.	3,020,000	1,797,000	5,536,000	3,052,400	3,062,000	5,206,275	2,687,556	3,216,789	3,649,010	5,928,850
Fireworks	lb.	2,264,162	1,661,229	2,410,388	2,446,428	1,504,896	1,339,733	3,410,741	3,540,825	3,181,411	2,270,869
Total	lb.	4,017,200	2,949,796½	4,084,608	4,257,885	3,119,608	3,031,143	5,004,417	5,216,614	5,243,916	4,328,322
Total	No.	3,020,000	1,797,000	5,536,000	3,052,400	3,062,000	5,206,275	2,687,556	3,216,789	3,649,010	5,928,850

APPENDIX E.

DEPARTMENT OF EXPLOSIVES.

NOTIFICATION.

Dated Calcutta, the 2nd March 1914.

No. 434.—With reference to Notification No. 4555—4, dated the 31st May 1907, of the Government of India, Department of Commerce and Industry, publishing rules to regulate the transport and importation of explosives, the following list of "authorized explosives" referred to in rule 9 (*1*) of the above rules is published for general information:—

LIST OF AUTHORIZED EXPLOSIVES.

The following explosives are at present authorized for importation into British India, for general sale:—

Class 1.—GUNPOWDER.

GUNPOWDER.

Class 2.—NITRATE MIXTURE.

AMMONAL.

CHILWORTH SPECIAL POWDER.

Class 3.—NITRO-COMPOUND.

Every explosive in this class and every explosive ingredient thereof shall be so thoroughly purified and otherwise of such character as to satisfy a test known as the heat test, and specified in the rule for testing explosives, published with Notification No. 4555—4, dated the 31st May 1907, referred to above.

Division 1.

ARDEER GELIGNITE.
BALLISTITE.
BLASTING GELATINE.
CAMBRITE.
CARBONITE.
CELTITE.
CHILWORTH SMOKELESS POWDER No. 2.
CORDITE.
CORDITE, M. D.
DYNAMITE.
FARMER'S DYNAMITE.
GELATINE DYNAMITE.
GELIGNITE.
MONOBEL POWDER.
PHŒNIX POWDER.
SAMSONITE.

Provided that every explosive in this division shall be of such character and consistency as not to be liable to liquifaction or exudation.

Division 2.

AMBERITE No. 2.
CHILWORTH SMOKELESS POWDER.
CHILWORTH SMOKELESS SPORTING POWDER.
E. C. SPORTING POWDER.
EMPIRE POWDER.
GUNCOTTON.
HENRITE.
IDEAL POWDER.
IMPERIAL SCHULTZE GUNPOWDER.
NEGRO POWDER.
NEONITE.
NOBEL'S SPECIAL POWDER OR IDEAL POWDER.
N. S. SMOKELESS.
PICRIC ACID.
PICRIC POWDER.
PRIMROSE SMOKELESS.
RENDITE.
ROBURITE.
RUBY POWDER.
SCHULTZE CUBE POWDER.
SCHULTZE GUNPOWDER.
SMOKELESS DIAMOND.
TONITE OR COTTON POWDER.

Class 4.—CHLORATE MIXTURE.

Nil.

Class 5.—FULMINATE.

Nil.

Class 6.—AMMUNITION.

Division 1.

Nobel's Safety Electric Time Fuze.	Safety Cartridges.
Percussion Caps.	Safety Fuzes for Blasting.
Railway Fog Signals.	Safety Electric Fuzes.

Division 2.

Cartridges for Cannon, Shells, Mines, Blasting or other like purposes.	Fuze lighters.
Cartridges for Small Arms which are not Safety Cartridges.	Fuzes for Shells.
Cordeau Bickford.	Instantaneous Fuze.
Electric Fuzes.	Port fires.
Filled Shells not containing their own means of ignition and closed by a substantial metal plug.	Tubes for Firing Explosives.
	Quick match.
	War Rockets.

Division 3.

Cartridges for Small Arms which are not Safety Cartridges.	Fuzes for Shells.
Detonators.	Nobel's Electric Detonator Time Fuze.
Electric Detonators.	Primers.
Friction Tubes.	Quick firing Ammunition.
	Tubes for firing Explosives.

Class 7.—FIREWORK.

Division 1.

Nil.

Division 2.—Manufactured Fireworks.

Manufactured Fireworks.	Magnesium Torches.
Aluminium Torches.	Pyrotechnic Matches.
Amorces.	Rockets.
Chinese Crackers.	Signal Lights.
Electric Sparklers.	

C. A. MUSPRATT-WILLIAMS, *Lieut.-Col., R.A.*,
Chief Inspector of Explosives in India.

APPENDIX F.

* List of non-dangerous petroleum installations licensed during the year 1913.

Province.	District.	No.	Province.	District.	No.
Ajmer-Merwara	Ajmer	4	Bengal	Backergunge	1
	Total	4		Bankura	1
Assam	Darrang	1		Bogra	4
	Kamrup	2		Birbhum	1
	Lakhimpur	2		Burdwan	7
	Total	5		Calcutta	6
Baluchistan	Quetta	3		Chittagong	5
	Total	3		Darjeeling	3
				Dinajpur	3
				Howrah	3
				Jalpaiguri	2
				Khulna	1
				Midnapur	3

* This list includes godowns for the storage of non-dangerous petroleum regarding which this Department has cognizance.

APPENDIX F—*contd.*

* List of non-dangerous petroleum installations licensed during the year 1913.—*contd.*

Province.	District.	No.
Bengal—(*concld.*)	Murshidabad	1
	Nadia	7
	Pabna	3
	Rajshaye	3
	Rangpur	8
	24-Parganas	11
	Total	73
Bihar and Orissa	Balasore	3
	Bhagulpur	5
	Champaran	4
	Cuttack	4
	Darbhanga	3
	Gaya	5
	Manbhum	4
	Monghyr	3
	Mozufferpur	5
	Patna	5
	Purnea	6
	Ranchi	1
	Sambalpur	7
	Saran	3
	Shahabad	3
	Sontal Parganas	6
	TOTAL	67
Bombay	Ahmedabad	5
	Ahmednagar	3
	Belgaum	4
	Bijapur	6
	Bombay	8
	Broach	6
	Dharwar	12
	Hyderabad (Sind)	1
	Karachi	6
	East Khandesh	4
	West Khandesh	6
	Nasik	8
	Poona	3
	Satara	3
	Sholapur	8
	Surat	6
	Thana	4
	Total	88
Burma	Hanthawaddy	7
	Magwe	12
	Mandalay	4
	Minbu	9
	Mingyin	2
	Pokoku	7
	Prome	3
	Thayetmyo	2
	Total	46
Central Provinces	Akola	6
	Amraoti	9
	Bhandara	7
	Bilaspur	4
	Buldana	9
	Chanda	3
	Hoshangabad	5
	Jubbulpore	6
	Nagpur	5
	Narsingpore	3
	Nimar (Khandwa)	5
	Raipur	3
	Saugor	3
	Seoni	3
	Wardha	9
	Total	80
Delhi	Delhi	6
	Total	6
Hyderabad	Hyderabad	11
	Secunderabad	3
	Total	14
Madras	Anantapur	4
	Bellary	5
	Chingleput	7
	Chittoor	1
	Coimbatore	7
	Cuddapah	2
	Ganjam	4
	Godavari	5
	Guntur	6
	Kistna	9

*This list includes godowns for the storage of non-dangerous petroleum regarding which this Department has cognizance.

APPENDIX F—*concld.*

* List of non-dangerous petroleum installations licensed during the year 1913—*concld.*

Province.	District.	No.
Madras—(*concld.*)	Kurnool	2
	Madras	6
	Madura	6
	Malabar	10
	Nellore	3
	North Arcot	7
	Ramnad	5
	Salem	3
	South Arcot	15
	South Canara	2
	Tanjore	20
	Tinnevelly	6
	Trichinopoly	7
	Vizagapatam	9
	Total	151
Mysore	Bangalore	11
	Total	11
North-West Frontier Province	Hazara	3
	Peshawar	4
	Total	7
Punjab	Ambala	8
	Amritsar	4
	Gurdaspur	1
	Jullundur	3
	Lahore	6
	Ludhiana	3
	Multan	1
	Rawal Pindi	3
	Shahpur	1
	Sialkot	4
	TOTAL	34
United Provinces	Agra	4
	Aligarh	2
	Allahabad	10
	Azamgarh	2
	Bahraich	1
	Ballia	1
	Bara Banki	2
	Bareilly	4
	Basti	8
	Benares	4
	Bijnor	4
	Cawnpur	3
	Dehra Dun	1
	Etawah	3
	Fyzabad	3
	Ghazipur	1
	Gonda	2
	Gorakpur	3
	Jaunpur	1
	Jhansi	3
	Lucknow	3
	Meerut	4
	Moradabad	3
	Muttra	1
	Saharanpur	3
	Shahjahanpur	3
	TOTAL	79

* This list includes godowns for the storage of non-dangerous petroleum regarding which this Department has cognizance.

SUMMARY.

	No.
Ajmere-Merwara	4
Assam	5
Baluchistan	3
Bengal	73
Bihar and Orissa	67
Bombay	88
Burma	46
Central Provinces	80
Delhi	6
Hyderabad	14
Madras	151
Mysore	11
North-West Frontier Province	7
Punjab	34
nited Provinces	79
TOTAL	668

APPENDIX G.

Summary of non-dangerous petroleum installations and godowns licensed for the nine years ending 1913.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
Ajmer-Merwara . .	3	3	3	4	4	4	4	4	4
Assam	...	...	...	...	...	...	...	3	5
Baluchistan . . .	...	...	1	1	1	1	2	2	3
Bengal	67	74	74	79	89	96	101	69	73
Bihar and Orissa . . .	...	...	...	...	...	...	...	67	67
Bombay	65	64	76	82	79	84	83	86	88
Burma	10	11	12	17	19	33	35	41	46
Central Provinces . .	49	49	67	66	69	71	74	81	80
Delhi	...	...	...	...	...	...	...	...	6
Eastern Bengal and Assam .	11	14	16	21	24	31	28	...	...
Hyderabad	...	...	...	...	...	2	11	12	14
Madras	49	57	89	97	95	114	129	138	151
Mysore	...	...	...	...	8	10	10	10	11
North-West Frontier Province	1	3	3	3	3	3	6	7	7
Punjab	9	12	23	26	28	30	35	39	34
United Provinces . .	44	44	47	48	59	61	65	71	79
TOTAL .	308	331	411	444	478	540	583	630	668

APPENDIX H.

Statement showing the quantity of petroleum imported by sea into British India during the nine years ending 1913.

NON-DANGEROUS PETROLEUM.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Chittagong . .	3,970,269	1,822,051	5,547,944	6,308,806	8,825,895	6,977,078	7,959,321	9,250,508	9,927,422
Balasore . .	10,000	26,200	...	...	...	...	...	...	...
Chandballi . .	367,500	405,000	270,200	206,150	208,200	259,000	227,400	256,800	306,000
Calcutta . .	27,144,014	20,342,078	27,342,923	33,379,196	26,599,239	18,642,248	27,089,471	26,468,283	28,720,828
Bombay . .	22,099,928	17,402,913	22,439,071	24,750,034	24,955,563	24,730,978	27,604,430	22,790,825	46,615,625
Sind . . .	5,157,947	5,007,932	7,171,933	10,448,574	9,719,214	8,295,644	9,689,900	7,274,695	10,043,396
Madras . .	9,765,384	6,956,459	8,942,869	13,018,601	13,720,767	10,006,706	15,113,287	10,625,192	12,406,817
Burma . .	1,595,209	1,156,179	1,828,973	2,514,834	1,119,719	1,197,661	1,283,641	1,018,526	1,146,967
TOTAL .	70,110,251	53,118,812	73,543,913	90,626,195	85,148,597	70,109,315	88,967,450	77,684,829	109,167,055

APPENDIX H—*continued.*

Statement showing the quantity of petroleum imported by sea into British India during the nine years ending 1913—*continued.*

DANGEROUS PETROLEUM.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Calcutta	14,500	...	12,270	20,048	42,965	44,708	83,800	32,080	349
Bombay	66,017	184,243	92,258	110,390	84,793	79,661	106,000	469,522	772,666
Sind	622	9,795	2,733	25,801	1,844	28,043	3,827	6,185	8,574
Madras	7,828	38,104	25,400	53,756	15,280	6,459	2,400	4,120	...
Burma	5	...	...	...	55	580	206	426	240
TOTAL .	88,972	232,142	132,661	209,995	144,937	159,451	196,233	512,333	781,829

Statement showing the quantity of petroleum produced in Burma and transported into British India during the five years ending 1913.

	1909.	1910.	1911.	1912.	1913.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Non-dangerous petroleum	83,299,134	85,356,057	100,758,865	100,152,787	108,781,833
Dangerous petroleum	648,878	922,481	1,619,527	1,392,616	2,445,242

Statement showing the quantity of petroleum produced in Assam and Burma during the nine years ending 1913.

NON-DANGEROUS PETROLEUM.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Assam . .	1,543,212	1,890,942	1,975,094	2,016,978	2,144,093	2,033,772	2,142,349	1,905,955	2,539,609
Burma . .	67,062,170	95,848,500	75,397,762	78,044,435	134,080,703	143,387,116	148,874,019	161,250,234	184,616,944
Total .	68,605,382	97,739,442	77,372,856	80,061,413	136,224,796	145,420,888	151,016,368	163,156,189	187,156,553

DANGEROUS PETROLEUM.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Assam . .	21,014	21,855	48,017	67,256	36,588	56,736	80,534	120,930	179,776
Burma . .	11,988,220	11,670,200	15,043,700	18,055,500	18,479,394	18,245,501	21,228,403	23,109,393	32,375,142
Total .	12,009,234	11,692,055	15,091,717	18,122,756	18,515,982	18,302,237	21,308,937	23,230,323	32,554,918

APPENDIX I.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1913 to 31st December 1913.

EXPLOSIVES.

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
1	3rd February 1913 .	Gunpowder . .	Jubbulpur . .	While a labourer was grinding gun powder in a mill consisting of two pieces of stone, the upper stone dropped on the lower one and broke causing the powder to explode and fatally injuring the man.	1	...
2	15th February 1913 .	Blasting powder .	Khandala . .	During rock cutting operations 2 Pathans were clearing a hole in which was a "misfire," of which the men were unaware. One of the men placed a bar in the hole while the other hammered it, when the misfired charge exploded, fatally injuring one of them and slightly injuring the other.	1	1
3	20th March 1913 .	Blasting powder .	Salem . . .	Two Indians, engaged in deepening a well, drilled 3 holes in it and filled them with blasting powder and ignited the charges. Two of the charges exploded but the 3rd failed. Thereupon the men got into the well and made a further attempt to explode the charge. While so attempting, the charge suddenly exploded fatally injuring one man and causing injuries to the other.	1	1
4	27th April 1913 .	Blasting powder .	Bombay . . .	Whilst blasting operations were being carried on, a stone weighing about 1¼ lbs. passed under the tatties put up as a protection and dropped on the head of a dhobie, who was washing clothes at a distance of about 200 yards fatally injuring him.	1	...
5	April 1913 . .	Gunpowder . .	Tiruchengodu, Salem	While testing some fireworks the spark from one accidentally fell on some gunpowder which caused it to explode fatally injuring a woman standing near by.	1	...
6	3rd May 1913 .	Gunpowder . .	Godaveri . .	A license holder of a gun powder shop sent three gunny bags of explosives in a cart to be kept in a field. The cartman carried them to the field, deposited them on the ground and sat smoking on one of the bags when it exploded and caused serious burns to six persons, two of whom died subsequently.	2	4
7	May 1913 . .	Gunpowder . .	Sattanaickampalaiyam.	Two Indians made a fire near the mouth of a well which they were boring and did not put out the fire before descending the well to place a blasting charge in it. A spark from the fire fell on the powder taken down which caused an explosion fatally injuring one man and slightly injuring the other.	1	1
8	28th July 1913 .	Gunpowder . .	Salem . . .	While blasting operations were being carried on in a well a piece of live coal accidentally fell on some powder which exploded fatally injuring one person and slightly injuring two others.	1	2
9	24th August 1913 .	Gunpowder . .	Salem . . .	An Indian placed a handful of powder in an Athirvadi, or iron pipe immediately after it had been fired. The powder caught fire in the barrel and the flame made its exit through the fire hole thus igniting the remaining powder which was close by thereby injuring four men, two of whom succumbed to the injuries.	2	2
10	September 1913 .	Gunpowder . .	Salem . . .	While two men were pressing in a charge of gunpowder in a well which was being deepened, the charge exploded injuring them.	...	2
11	12th October 1913 .	Gunpowder . .	Salem . . .	While an Indian was charging a bore in a well, a spark from a fire in the neighbourhood fell on some powder which had been placed outside the bore and caused an explosion fatally injuring the man.	1	...

APPENDIX I—*contd.*

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1913 to 31st December 1913—*contd.*

EXPLOSIVES—*contd.*

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed	Injured.
12	15th October 1913 .	Gunpowder . .	Bombay . . .	Four persons were trying to dispose of 3 lbs. of gunpowder by burning, when the powder suddenly exploded injuring the men. It appears that one of the men laid a trail of gunpowder about 100 feet long and tried to burn it, but as it would not light he thought that the powder on the ground was not enough and he began to pour some more on it at the place where he had tried to ignite it when the gunpowder suddenly ignited and the flames caught the bag containing gunpowder which he had in his hand setting it on fire with the result that it exploded burning the other three persons who were with him.	...	4
13	6th November 1913 .	Gunpowder . .	Salem . . .	Three men who were engaged in well excavation work, were warming themselves over a fire when some powder which happened to be near exploded injuring them and another man.	...	4
14	4th December 1913 .	Gunpowder . .	Salem . . .	Two boys who were engaged in blasting rock had placed some wet powder in the sun to dry. One of them carried a lighted match near it to see if it had dried when it ignited, injuring both the boys.	...	2
15	7th December 1913 .	Gunpowder . .	Bombay . . .	A sweeper, while sweeping a room, picked up a bottle containing some gunpowder and took it into the kitchen, where he poured the powder on to a bit of burning wood taken from the fire. The powder exploded and scorched him about on both legs and burned another person on the right hand.	...	2
				Total .	12	25
16	17th January 1913 .	Gelignite . . .	„ . . .	In connection with blasting operations 20 charges were laid down and after the alarm bugle was sounded the charges were fired, 19 went off and one of the labourers believing that they had all been discharged came back to continue his work before the "cease fire" sounded with the result that the 20th charge went off under him blowing him about 10½ yards away. The man died immediately.	1	...
17	23rd February 1913.	Dynamite . .	Kotri . . .	A charge of dynamite was fired under a snag in a river from an anchor boat. When the fuse was ignited, the boat moved off to a safe distance. A boatman who was on the river bank, a distance of about 65 paces from the snag, was struck down with a piece of the snag as he was in the act of running away after the explosion. The man had ample time to be far away, but it appears he wanted to see the explosion and fragments flying in the air.	1	...
18	30th May 1913 .	Dynamite . .	Kannenderi, Salem .	While blasting operations were being carried on in a mine five out of six charges exploded. A cooly contrary to orders drove a jumper into the misfired charge when it exploded seriously injuring another man who was near by. The cooly was prosecuted and sentenced to two months' rigorous imprisonment.	...	1
				Total .	2	1
19	15th May 1913 .	Detonator . .	Murwara . .	A detonator while being handled by a cooly exploded injuring two fingers of one of his hands.	...	1
				Total .	...	1
20	27th January 1913 .	Fireworks consisting of sulphide of arsenic and chlorate of potash.	Rangoon . .	It is believed that an Indian and his eight year old son were making throw-down fireworks when an explosion occurred seriously injuring both of them.	...	2

APPENDIX I—*contd.*

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1913 to 31st December 1913—*contd.*

EXPLOSIVES—*contd.*

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
21	26th March 1913	Fireworks consisting presumably of a sulphur chlorate mixture.	Calcutta	While a lad was preparing a *patáka* (throw-down cracker) it suddenly exploded seriously injuring his right foot.	...	1
22	14th April 1913	Firework composition presumably a sulphur chlorate mixture.	Howrah	An Indian lad was handling a quantity of throw-down bomb powder when the packet exploded seriously injuring him. (Newspaper.)	...	1
23	28th April 1913	Firework composition.	Garha near Jubbulpur.	While a woman was grinding *Hartal* (orpiment or yellow arsenic) with presumably chlorate of potash in a stone mortar with a wooden pestle, the substance suddenly ignited and set the house on fire. The house was burnt down and when the fire was extinguished the body of the woman's grandson was discovered among the ruins. The woman sustained burns on her arms and legs. There were some fireworks in the house at the time and probably some gunpowder also. These exploded after the house caught alight.	1	1
24	21st June 1913	Fireworks	Madura	An Indian while firing a rocket burnt himself severely and died from the effects. A lad who was standing near by was also injured.	1	1
25	21st August 1913	Fireworks	Tiruvannamalai	A licensee illegally kept gunpowder and fireworks in his dwelling house instead of in the place authorised by the license, and on the day of the explosion while his wife was selling some gunpowder to some men an explosion suddenly occurred fatally injuring seven people.	7	...
26	August 1913	Fireworks	Coimbatore	While fireworks were being fired at a festival five persons who were standing near were injured.	5	...
27	7th September 1913	Fireworks	Chittoor	After an Adervidi was loaded with powder and fire applied to it the explosion instead of occurring at the top found its way through a hole in the bottom of the Adervidi injuring six people who were near by.	6	...
28	26th September 1913	Fireworks, aluminium matches.	Bombay	While a case of aluminium matches was being dumped on to a wharf it burst into flames and set fire to 27 bags of cotton seed t were close by. A few buckets of water soon extinguished the fire.	...	...
29	18th October 1913	Firework containing a sulphur chlorate mixture.	Vikramam, Trichinopoly.	Two Indians were manufacturing crackers known as Urundaippattasu which are made of chlorate of potash, yellow arsenic and a small ball of clay. While rolling the mixture in a bit of cloth and tying it, the mixture exploded killing both the men.	2	...
30	21st October 1913	Firework composition	Puttanattam, Trichinopoly.	An Indian struck a match to show a purchaser some fireworks when a spark fell on the composition exploding it causing fatal injuries to the man and serious injuries to another.	1	1
31	27th October 1913	Fireworks consisting of chlorate of potash and red sulphide of arsenic.	Calcutta	After having mixed chlorate of potash with red sulphide of arsenic a lad put a few pieces of stone in it and then wrapped some torn rags round it when the mixture exploded in his hands causing him injuries.	...	1
32	27th October 1913	Firework composition consisting of chlorate of potash and sulphide of arsenic.	Coconada	The two substances were placed in an earthen basin and were being pounded with a stone when an explosion occurred injuring four persons, two of whom died from their injuries.	2	2
33	10th December 1913.	Firework composition consisting of Realgar and chlorate of potash.	Madura	While a person was weighing for sale a mixture of Realgar and chlorate of potash, the mixture suddenly exploded injuring five persons.	...	5
				TOTAL	14	26

APPENDIX I—*contd.*

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1913 to 31st December 1913.

PETROLEUM.

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
34	18th January 1913 .	Petroleum . .	Rangoon . .	A secuni and lascar employed on board the oil tanker S. S. "Singu" smuggled ganja and in order to escape detection concealed the bags containing the ganja on the gusset stay about 12 or 13 or 14 feet from the bottom of an empty oil tank. When the tank was being again re-filled the men went inside the tank in order to get out the ganja when there was about 4 feet of oil in the tank and in their attempt to get at the bags of ganja both were evidently suffocated by the oil fumes which caused them to fall down into the oil tank. Another man went down the ladder into the tank and was also suffocated by the oil fumes and fell into the tank.	3	...
35	25th February 1913.	Petroleum . .	Bogyok . . .	An explosion took place at the refining of the Burma Oil Co. by a blow back from the oil furnaces whereby three men were injured, two of whom died from the effects.	2	1
36	22nd March 1913 .	Oil gas . . .	Twingon Reserve .	The Warden, Burma Oil fields, reported that an explosion was heard at the Indo-Burma Petroleum Company's well No. 10 and immediately the rig caught fire. 16 coolies were putting tubing on the well and had gathered outside the rig cleaning off the oil from their bodies with mud, prior to going home to breakfast. Three of them received severe burns and three slight burns, the others were unharmed. The derrick collapsed *in situ* which was fortunate as the wells around it were making considerable quantities of gas. The Fire Brigade extinguished the fire in about three hours and they were lucky to have got it out by then as the well flowed twice. The cause of the fire is not known, but it appeared probable that the gas caught fire from a gas engine which is used to pump the well.	...	6
37	May 1913 . .	Kerosene . .	Calcutta . .	A little girl was attending to some cooking on an oil stove, when her clothes caught fire, and were soon in flames. Her parents succeeded in subduing the flames, but not before the girl had been rather badly burnt (Newspaper).	...	1
38	10th May 1913 .	Petrol . . .	Lucknow . .	A fire broke out at La Martiniere Girls School, owing to a bearer taking a light with him when going to pour petrol into a tank used in connection with a petrol gas plant. The bearer was the only person injured.	...	1
39	16th June 1913 .	Kerosene . .	Karachi . . .	Paraffin oil was being filled into a tank on board the S. S. "Hesleyside" and the filling pipe which led from the deck to the tank was used till it broke down, and then the man-hole door of the tank was removed and it was filled with buckets, when some of the oil being spilt, it was ignited by a lamp near by and a fireman was injured.	...	1
40	1st August 1913 .	Petroleum . .	Syriam . .	In consequence of stormy weather a pontoon supporting the oil pipes of the Burma Oil Company sank and orders were given to disconnect the oil pipes from the pontoon. Although a large number of pipes had been uncoupled, the work was not completed in day light and was carried on after dark, the uncoupled pipes being placed in a barge close by in which a lamp was burning. The uncoupling of the pipes resulted in oil trickling out and floating on the water and it is surmised that the vapour arising from this oil was set alight to by the lamp in the boat. The evidence on this point, however, is not clear, the witnesses merely being able to state that the oil on the water suddenly took fire and that two men were badly burnt, one of whom subsequently died from the burns received.	1	1

APPENDIX I—*contd.*

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1913 to 31st December 1913—*contd.*

PETROLEUM—*concld.*

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of Persons	
					Killed.	Injured.
41	20th September 1913	Petrol . . .	Agra . . .	While tins of petrol were being unloaded from a railway wagon, a spark caused by the forcing out of a tin from the consignment, which was tightly packed in the wagon, ignited the petrol which injured one man.	...	1
42	4th November 1913 .	Petrol . . .	Tuticorin . .	See Appendix L.	9	3
43	14th November 1913.	Petroleum . .	Bombay . . .	A quantity of refuse oil was kept in a faulty cylinder in the engine room of the S. S. "Virawa" and as the 4th engineer passed by with a naked oil lamp in his hand the fumes given off by the oil took fire with the result that he received several slight burns.	...	1
44	21st November 1913.	Kerosine . .	Poona . . .	An Indian was attending to a Kitson lamp in his shop. A servant was pumping the oil into the lamp while it was lighted and the lamp burst. The pressure in the cylinder being high, the cylinder burst also, and the ignited oil was spread about the shop which was in flames in an instant. The man and his servant were fatally burnt, while the man's wife was severely burnt on her hands and face in trying to put out the flames.	2	1
45	29th November 1913.	Petrol . . .	Cochin . . .	The S. S. "Singu" a steamer belonging to the Burma Oil Co., arrived at Cochin from Rangoon on the 24th November 1913 with a cargo of bulk oil and petrol in tins. She began discharging her petrol on the morning of the 29th November. Four lighters came along side her to receive the petrol. These included lighters Nos. 31 to 70. About 1-30 P. M. when the men were occupied in unloading the drums and tins into boat No. 31, a sudden explosion occurred towards the stern of boat No. 31. The boat was soon in flames and communicated the fire to boat No. 70 which was empty and to the steamer. Boat No. 31 was cast off and it drifted towards the stern of the S. S. "Singu". The cable of the ship was heaved in 45 fathoms in order to clear the burning lighter which fell astern. As boat No. 31 drifted past the weather side of the vessel, flames and fumes were blown right across the ship, burning and scorching the upper structure and rails. The fire on the vessel was extinguished in about an hour's time. Four coolies of boat No. 31 were severely burnt of whom two since died. Boats Nos. 31 and 70 drifted and were completely burnt. The damages to the S. S. "Singu" are estimated at Rs. 5,000.	2	2
				Total .	19	19
		MISCELLANEOUS.				
46	7th October 1913 .	Acetylene . .	Bombay . . .	Two men who assisted in working a machine used for cutting iron by means of Acetylene, proceeded to break up carbide of calcium on the hatch of a steamer. One of them carelessly placed a naked light near the machine with the result that some gas which was escaping from the machine took fire and burnt the two men about their faces and bodies.	...	2
47	3rd November 1913 .	Chlorate of potash .	Pedapudi, Cocanada .	An Indian was pounding some chlorate of potash in an earthen basin when the substance exploded seriously injuring the man	...	1
				Total .	...	3

APPENDIX I—*contd.*

Summary of accidents during the year 1913.

Explosives or dangerous and inflammable substances.	ACCIDENTS CAUSING LOSS OF LIFE AND BODILY INJURY.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons			
		Killed.	Injured.		
EXPLOSIVES.					
Gunpowder	15	12	25	...	15
Nitro-compounds	3	2	1	...	3
Ammunition	1	...	1	...	1
Fireworks	13	14	26	1	14
TOTAL	32	28	53	1	33
PETROLEUM.					
Petroleum generally	12	19	19	...	12
TOTAL	12	19	19	...	12
Chemicals	...	...	...	...	...
TOTAL	...	...	...	...	...
Miscellaneous	2	...	3	...	2
TOTAL	2	...	3	...	2
GRAND TOTAL	46	47	75	1	47

APPENDIX J.

Detailed statement showing the number of accidents and persons killed and injured during the eight years 1906 to 1913.

YEAR.	GUNPOWDER.			DYNAMITE AND OTHER NITRO-COMPOUND BLASTING EXPLOSIVES.			AMMUNITION.			FIREWORKS.		
	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.
1906	13	21	28	2	1	2	...	...	...	11	4	14
1907	11	18	20	4	...	6	3	...	4	19	12	20
1908	19	27	64	4	1	4	1	...	1	22	26	23
1909	15	19	26	4	1	5	2	...	2	19	21	41
1910	9	10	11	4	1	4	...	...	...	21	30	58
1911	9	14	8	4	4	29	...	...	...	17	13	24
1912	10	13	6	5	5	35	1	...	1	12	4	16
1913	15	12	25	3	2	1	1	...	1	14	14	26
TOTAL	101	134	188	30	15	86	8	...	9	135	124	222
AVERAGE	12	17	23	4	2	11	1	...	1	17	15	28

APPENDIX J—*contd.*

Detailed statement showing the number of accidents and persons killed and injured during the eight years 1906 to 1913.

Year.	Petroleum.			Chemicals.			Miscellaneous.		
	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.
1906	10	9	3	...	...	...	3	1	1
1907	15	9	8	...	...	...	6	7	2
1908	41	37	6	6	...	6	5	2	8
1909	23	17	25	3	6	6	5	4	13
1910	19	29	19	2	2	1	8	5	9
1911	30	21	35	2	1	1	6	299	27
1912	17	25	12	2	...	1	1	1	1
1913	12	19	19	...	...	...	2	...	3
Total	167	166	127	15	9	15	36	319	64
Average	21	21	16	2	1	2	4	45	8

APPENDIX K.

Comparative statement showing the number of accidents and persons killed and injured during the eight years 1906 to 1913.

Year.	Accidents causing loss of life or bodily injury.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons killed.	Number of persons injured.		
1906	34	36	48	5	39
1907	50	46	60	8	58
1908	75	93	112	23	98
1909	70	68	118	1	71
1910	55	77	102	8	63
1911	64	352	124	4	68
1912	44	48	72	4	48
1913	46	47	75	1	47
Total	438	767	711	54	492
Average	55	96	88	7	61

APPENDIX L.

Copy of Report No. 339, dated Tuticorin, 15th November 1913, from Captain J. S. Rush, Inspector of Explosives, to the Chief Inspector of Explosives with the Government of India, Calcutta.

I have the honour to report that in accordance with the instructions contained in your telegram of 7th instant I proceeded from Bombay to Tuticorin to enquire into the cause of explosion and fire which occurred in the harbour on the 4th instant on Lighter No. 23 and was communicated to the S. S. " Twingone ", a steel built tank oil steamer owned by Messrs. The Burmah Oil Company of Rangoon.

2. Owing to the breaches on the South Indian Railway that had been caused by the recent heavy rains, I had to proceed *viâ* Jalerpet, and Erode to Trichinopoly, where I was held up for a day, and so did not reach Tuticorin until 11 A.M. on the 12th instant.

3. I called on the Port Officer and the Joint Magistrate. The former was good enough to place an office room at my disposal and the latter gave instructions to the Police to produce those Indian witnesses whose statements I required.

4. The S. S. " Twingone ", Captain O. A. Barrand, arrived at Tuticorin from Rangoon at daybreak on Monday, 3rd instant, with the undermentioned cargo.

	For Tuticorin.	For Cochin.
Kerosene oil in bulk gallons	277,200	247,800
Petrol in 4 gallon drums „	9,488	8,000
„ 2 „ tins „		2,994
Benzine in 4 gallon drums „	3,028	
Liquid fuel, casks		170
Lubricating oil „	8	30

5. On the 3rd, 270 tons of bulk oil and 1,393 drums of petrol and benzine were discharged, and on the 4th, 200 tons of bulk oil, 1,750 drums of petrol and two casks of lubricating oil, so that the cargo remaining on the steamer consisted of —

Kerosene oil in bulk	gallons	394,600
Petrol in 4 gallon drums	„	8,000
„ 2 gallon cases	„	1,497
Lubricating oil	casks	36
Liquid fuel	„	170

while on board the lighter there were 1,750 4-gallon drums of petrol and 2 casks of lubricating oil.

6. On the 4th morning bulk oil had been discharged from No. 4 tank, which was emptied into a barge on the port side. The barge left the steamer about half past eleven and the only lighter alongside was boat No. 23, licensed by Tindal Ponnaya Villavarayan, which had been receiving drums of petrol since 8 A.M. When all the petrol for Tuticorin had been discharged, the lighter was moved forward to take in eight casks of lubricating oil. It lay on the starboard side of the steamer, which was the weather side, a slight breeze blowing across and slightly ahead the steamer.

7. I inspected a lighter similar to No. 23 and found that right forward there is a covered locker which is used for the storage of rope, etc., while right aft there is also another small covered space used by the crew. Immediately in front of this is a wooden box containing sand in which a fire for cooking is made. The rest of the lighter is open and the space used for storing cargo.

8. At 1-45 P.M., when 1,750 drums of petrol and two casks of lubricating oil had been stored in the lighter, a loud explosion occurred and all the witnesses but one agree that the lighter was immediately enveloped in flames which rose to a considerable height.

9. The blazing lighter was at once cast off, but as she was on the weather side she drifted slowly aft and past the stern, while the flames were swept by the breeze over the steamer setting fire to the awnings, spars, bridge and all wood-work. While she was thus drifting drums of petrol were continually exploding and being blown to a considerable height in the air, the burning petrol in some cases falling into the sea. So rapid was the progress of the fire that in less than two minutes it was impossible to remain anywhere in the vicinity of amidships or to pass from fore to aft.

10. At the time of the explosion the Captain was on the Bridge deck, the Chief and Second Officers were in their cabins and the Third Officer was superintending the discharge of the cargo. The Chief, Second and Third Engineers were on the poop deck, having just finished tiffin.

11. The Captain tried to reach the hose in the centre of the ship but was driven back by the flames and then went to his cabin to rescue his wife, two children and ayah. The Chief and Third Officers made their way forward and tried to muster some of the crew but the

lighter were panic-striken and rushed to the stern of the steamer where a gig and lifeboat were lying in the water. They capsized the gig and about forty of them were in, or hung on to, the life boat. By the time that the Captain got to the poop with his wife the boats had drifted off. He gave her a lifebuoy and they all went overboard into the sea. She supported herself and young baby until she was picked up by the port launch, but while in the sea she was burnt by a splash of flaming oil or petrol. The Captain swam until he was picked up by the launch, but his daughter, about two years old, and the ayah were drowned.

12. In addition to the Captain's child and the ayah, the following were drowned :—

The Chief Engineer ;
The Second Engineer;
W. Leverett, son of the Port Officer, 11 years old ;
M. Costa, Goanese steward ;
J. Piries „ „

but no one on the steamer, except the Captain's wife, received any injuries.

13. Of the men in the lighter two, Jesnadia and Soosal Michael, were badly burnt and died subsequently in hospital. Ponnaya Nadan (son of Kundaswami Nadan) was moderately burnt and is still under treatment in hospital, while the boy Paul was slightly singed. The other two men, Janvasti Fernand and Ponnaya Nadan (son of Tiruvadi Nadan), who went out with the lighter were on the steamer when the explosion occurred.

14. The lighter eventually burnt out and the remains drifted ashore, but when I arrived at Tuticorin on the 12th the "Twingone" was still burning at the anchorage some six miles out.

15. I limited the scope of my enquiry to trying to ascertain the cause of the explosion on the lighter and how the fire was communicated to the steamer. I understand that the Government of Madras has ordered full enquiry to be made into the regrettable loss of life and the destruction of the steamer.

16. Statements by the Captain, Chief and Second Officers, Third Engineer of the S. S. "Twingone," Mr. J. Farquharson (of Messrs. Shaw Wallace and Company), also those of Janvasti Fernand (Acting Tindal of the lighter), Ponnaya Nadan (son of Tiruvadi Nadan), Ponnaya Nadan (now in hospital), and the boy Paul who belonged to the crew of the lighter, are attached.

17. From the statements the following points may be gathered :—

(*a*) The lighter on which the explosion occurred did not belong to Messrs. Shaw Wallace and Company but was an ordinary cargo lighter.

(*b*) It had, however, been used for some time to carry petrol ashore and the crew understood that any fires, lights or smoking when alongside the steamer or when carrying this cargo were dangerous.

(*c*) The regular Tindal, in whose name the boat was licensed, did not go out with her on the 4th November, and one of the crew Janvasti Fernand was acting as Tindal.

(*d*) As soon as the lighter left the shore at 6 A.M., a fire was made for cooking. The fire consisted of sticks of wood on some sand in the box and was lighted with matches.

(*e*) Two of the boatmen state that the fire was lit by the boy Paul, while Ponnaya, now in hospital, states that he lit the fire, and Paul corroborated this statement. Ponnaya now in hospital used to cook the food, Paul was his assistant. The box of matches was afterwards placed in a canvas bag or bucket and kept in the covered portion at the stern of the boat.

(*f*) Janvasti Fernand and Ponnaya, son of Tiruvadi Nadan, each state that they threw the box into the sea sometime before reaching the steamer. Ponnaya, now in hospital, states that he did not see it again, while the boy Paul says that it was thrown into the sea by Ponnaya, son of Tiruvadi Nadan.

(*g*) Janvasti Fernand, Ponnaya, son of Tiruvadi Nadan and Ponnaya, now in hospital, each states that he put out the fire by drenching it with water and threw the ashes into the sea. Paul states that this was done by Ponnaya, now in hospital.

(*h*) None of the witnesses admit that they saw any other fire or light, or that they saw anyone smoking on board the boat that morning, but it is admitted that sometimes the men do smoke in the boat and Captain Barrand states that on several occasions he has had to order the crew of a lighter alongside to put out a fire or to stop smoking.

(*i*) When the lighter arrived alongside the steamer about 8 A.M., the Chief Officer examined it from the ship's gangway to see if there were any signs of fire on board, but as Janvasti Fernand states that the fire had been made in the covered portion of the boat it would possibly not be seen from the steamer if it were still smouldering. The ship's officers have no instructions to search lighters for fire or the crew on them for matches unless any of the crew come on board the steamer.

(*j*) 1,750 4-gallons drums of petrol had been loaded in the after and midship parts of the lighter and only eight casks of lubricating oil remained to be discharged into it. After the drums had been stored, some coolies from the steamer came on board and ate some of the food that had been left over from the morning meal. They ate it cold and no fire was made to warm it. They went back on board the steamer.

(*k*) The lighter was moved forward to receive the casks from the forward cargo hatch. Two casks had been lowered into the fore part of the lighter and the ropes were being got ready for the next load when a loud explosion occurred.

(*l*) At this time Janvasti Fernand and Ponnaya, son of Tiruvadi Nadan, were on the steamer and there were only three men and a boy in the lighter. Jesuadia and Soosai were in the fore part attending to the unloading of the casks. Ponnaya now in hospital and the boy Paul were in the stern. Ponnaya states that he was feeling giddy and had gone to sleep and that when he last saw Paul he was fishing. Paul states that Ponnaya was carrying ropes at the moment when the explosion occurred and that he (Paul) was getting some betel and nuts from the covered portion in the stern for his father.

(*m*) All witnesses agree that they heard the explosion before they saw any fire and that the flames first appeared in the aft part of the lighter. This is close to the place where the fire had been, and the matches usually kept, and where Ponnaya, now in hospital, and the boy Paul were at that time.

(*n*) All the witnesses agree that the fire was communicated from the lighter to the steamer and did not originate on the steamer.

(*o*) The doors and ventilators of Nos. 1, 2 and 3 tanks, which were full, were closed, those of No. 4 tank, which had been emptied about half past eleven, as well as some of the hatches on the forward pockets, from which the drums of petrol had just been discharged, were open, as well as the forward cargo hatch, but these were closed immediately the fire broke out.

18. From the statements it does not appear that the fire was caused by any carelessness or want of precaution of anyone on board the steamer.

19. It is well known that neither petrol nor its vapour can be exploded or lighted merely by friction or heat, nor is it liable to spontaneous combustion, and in order to cause such an explosion as that described in the evidence either an electric or other spark, or naked fire or light, must have been brought into contact with a mixture of petroleum vapour and air.

20. The chance of an electric or other spark may be eliminated. As regards a fire it is noticed that the lighter reached the steamer about 8 A.M. and that the explosion did not occur until 1-45 P.M., so that it is hardly likely that a fire would be smouldering on the lighter so long without the smoke being noticed by some one on the steamer, nor would it be probable that the coolies who are stated to have eaten some of the remains of the morning's meal on the lighter could have made a fire without it being observed.

21. The statements of the Indian crew of the lighter are very contradictory and must be regarded with suspicion. It is impossible that three men could each have put out the fire or that both Janvasti Fernand and Ponnaya, son of Tiruvadi Nadan, could have thrown the box of matches into the sea. Moreover it is very doubtful whether Indians of this class could throw away a box of matches, and I am of the opinion that this was not done but that it was left in the canvas bag in the stern.

22. After considering all the statements I can only conclude that the explosion and fire were caused by someone striking a match on the lighter.

23. I would point out that in accordance with Rule 20 (2), Part III of Rules under Section 9 of the Indian Petroleum Act, 1899, casks of lubricating oil should not have been loaded in the same lighter as drums of petrol.

24. I would recommend that in future no fire, naked lights, matches or smoking should be allowed on any lighter or boat on the day that it is going to carry petroleum, and that it should be distinctly laid down on whom the responsibility for seeing that these orders are carried out is to rest.

25. In conclusion I would express the thanks that are due to the Joint Magistrate, the Port Officer, and Messrs. Shaw Wallace and Company, Tuticorin, for the assistance they afforded me in this enquiry.

STATEMENT BY CAPTAIN O. A. BARRAND.

On the 4th November, weather fine, sea calm, light easterly wind blowing across and a little ahead of the steamer a lighter which had been loaded with drums of petrol was secured at fore part of starboard side taking in casks of lubricating oil. At 1·45 P.M. there was a terrible explosion. I was on the bridge deck and saw a mass of flame at the after end of the lighter. I ran to the Chief Officer and told him to cast it a-drift. The flames were blowing across the ship and set fire to the awnings, spars and wood-work. They were free from oil, but very dry and caught fire immediately. In less than two minutes it was impossible to remain in the vicinity of amidships or to pass from forward aft. There was no time to get hoses

or pipes working. The crew and coolies ran aft. I made aft to try and get the hose but could not get any of the crew to assist. The lighter drifted slowly astern along the starboard side of the steamer. It took about five minutes to clear. The flames swept the deck setting fire to all wood-work, such as the bridge, poop, deck cargo and pocket hatches where the petrol had been or was stored. The oil tanks have iron doors on hinges. All the pocket hatches on the after deck were closed and all the tank doors, except No. 4 tank, which had just been emptied and which was closed immediately after the explosion. The pocket hatch on the starboard side, nearest to the bridge was, I think, open, also the cargo hatch right forward from which casks of lubricating oil were being discharged. Two ventilators of No. 4 tank were also open. Bulk oil is pumped out amidships abaft the bridge on the port side, but no pumping was being done when the explosion occurred.

Some eighteen months ago instructions were issued to all Commanders that all coolies coming aboard to work cargo were to be searched for matches before going below, but it was not understood that these instructions extended to coolies on the lighter or to the lighter itself. I am aware that it is customary for boatmen to cook on the lighters, but this would under no circumstances be permitted when the lighter was alongside the steamer. On several occasions I have had to order the crew of a lighter alongside to put out a fire and to stop smoking. The lighter No. 23 had frequently been employed before carrying petrol. During the past six months the condition of the drums has been much improved so that there has not been so much leakage as before. The drums are unloaded and loaded by hand, each one is handled separately.

When I was in the launch about an hour after the first explosion I heard an explosion on the steamer which I think must have been the tank top of No. 1 tank.

Statement by Mr. D. Scott, Chief Officer.

I have noticed lighter No. 23 working petrol drums from the steamer before. When the lighter came alongside at about 8 A.M. on the 4th November, I carefully examined it from the ship's gangway to see if there were any signs of fire on board, but did not see any. I am not aware that there is any order that the lighter or men on board should be searched unless any of them come on board the steamer.

The 3rd Officer was superintending the working of the cargo and I was also present most of the time. At about 1-30 P.M. we finished loading petrol, having completed the consignment for Tuticorin and I ordered the barge forward to No. 1 hatch. There was a space in the lighter clear of all drums which had been reserved for eight casks of lubricating oil. I went forward along with the 3rd Officer and got him started. I saw two casks going over the rail and being lowered into the lighter. Then I left him giving him instructions to superintend the lowering of all the casks for Tuticorin and went to my cabin to fill in the boatnote for this lighter. Before going to my cabin I went on the after deck and secured the petrol hatches and also the ventilators. I had two sikkanies with me. As soon as I entered my cabin I heard an explosion on the lighter. I could see the lighter from the port of my cabin. I rushed on deck and looked in the lighter and saw a small flame on the top of the after drums next to the stern of the lighter. There was an interval of about two minutes between the time when I first saw the small fire on the drums and when the flames shot up and enveloped the bridge. There was one man and a boy then at the after end of the lighter. The lighter had drifted about half its length and the stern of the lighter was then opposite to the bridge. The flames from the lighter set fire to all the wood-work, awnings, spars, etc., on the steamer. They were free from oil, but very dry. After I saw the flame the door of No. 4 tank, which was empty, was open and the hatches were off the cargo hatch and two port and after forward starboard pockets. I had the doors of No. 4 tank closed and at once secured the hatches and ventilators. The pocket hatches are wood-work. There was no other lighter alongside. The one with bulk oil had left the steamer about half past eleven. When the barge had drifted about amidships there was an explosion on the steamer which I think must have been the petrol in the after pockets. While the lighter was drifting slowly towards the stern there were a succession of small explosions on it and after she had cleared the steamer I saw drums of petrol blown about fifty feet into the air. They were burning. Lighted petrol was seen floating on the sea. Drums of petrol are not discharged in a sling but separately by the hand. The drums have been in good condition during the 5½ years experience that I have had. Two forward hoses were connected to the water service pipes, but the hoses were rendered useless by fire, so that no water came along. The lighter took from twenty minutes to half an hour to clear the stern of the steamer.

Statement by Mr. John Wood, 3rd Officer.

At about 1-45 P. M. on 4th November I was looking after the discharge of the cargo from the forward hatch. Two casks had been lowered into the lighter, which also contained petrol in drums and I gave the orders to heave up the empty fall and also to make fast the end of the guy. While that was being done the explosion occurred. I looked at the lighter and saw a fire at the stern end. In a moment it was a mass of flames and set fire to the awnings and spars of the steamer. The lighter was cast adrift. It drifted slowly astern setting fire to all wood-work on the steamer as it drifted along. During this time I heard

several explosions which in my opinion were on board the steamer in the after pockets where drums of petrol were stored. Both forward pockets were empty, having been discharged the day previous. No. 4 tank was also empty. An explosion occurred on board a few minutes after the first explosion. So far as I am aware no hatches except No. 1 hold were open. Myself and the Chief Officer got hold of a hose but it was in flames. We then tried to get aft but could not do so. We tried to fight the fire with buckets of water. There were also two sikkanies and a lascar with us. I saw the hatch of the starboard after forward pocket on fire and extinguished it with an old "dodger" and water. To the best of my knowledge the covers were on the ventilators and tanks.

When the lighter first came alongside at 7-55 A.M. I made it fast to the starboard side and examined the coolies that were coming on board the steamer, but found no matches. I have never received any instructions to search the lighters or the men on them, unless they were coming on board the steamer. Lighter No. 23 may have taken petrol from the steamer before. I have never seen a fire or men smoking on a lighter when it first came alongside. Drums of petrol are not unloaded in slings but are passed carefully by hand. There will be some that leak a little. We had unloaded all the petrol and benzine for Tuticorin so that the forward pockets were empty,

STATEMENT BY MR. H. BANKS, 3RD ENGINEER.

At about 1-45 P.M. on the 4th instant I was aft. We had just finished tiffin and I was sitting at the table on the poop with the Chief and Second Engineers when I heard an explosion on the lighter and saw two drums of petrol thrown into the air. They were not alight. Three of us ran forward. When I got through the alleyway I saw the lighter on fire. It would take me nearly a minute to get from the poop and through the alleyway. The flames on the barge were then leaping up the side of the steamer, but the awning and spars were not then alight. I saw two of the crew of the lighter jump into the sea forward. I then returned through the alleyway and saw the boat at the side. The bridge and awnings had taken fire. One of the dockmen got hold of the hose and coupled it to the water service pipe on the port side. We got water through but the crew stampeded. I then went on to the poop and saw the men jump into the sea and upset the gig. Those in the water then made for the lifeboat. The lighter would have been about three minutes in clearing the steamer. As she drifted down the starboard side, the flames, which were very high were sweeping over the steamer setting fire to everything inflammable on deck. I heard continual explosions in the lighter. About ten minutes after the first explosion when I was in the Port Officer's launch I heard a loud explosion on the steamer and saw a volume of white smoke coming up from the steamer.

STATEMENT BY MR. J. R. FARQUHARSON OF MESSRS. SHAW WALLACE & CO.

Lighter No. 23 has been in use for the last year for carrying petrol. The Tindal had standing instructions to see that there is no fire or light on the lighter when approaching the steamer or at any time when petrol is on board. On the 4th November the Tindal was sick and did not go out in the lighter. One of the crew, who had regularly worked on the barge, was in charge. He was acquainted with the standing instructions. It is customary when the lighters leave early in the morning and are away all day for the men to cook a meal on board.

Janvasti Fernand.—States that on 4th November I was on lighter No. 23. I left the shore at 6 A.M. At once Ponnaya, who is now in hospital, and the boy Paul began to cook food. When the lighter reached the lighthouse on the Island the cooking was finished, that was about three miles from the steamer. They lighted the fire for cooking with matches. I do not know who lighted the fire. I saw the boy Paul put the box of matches in a bucket. Before the lighter reached the steamer I saw the box in the bucket and threw it into the sea. I threw it away because on previous occasions some of the officers of the steamer had told us that we should not have any matches on the lighter.

Tindal Villavarayan was not on the lighter that day. As I was next senior on lighter I took charge.

I am aware that there should not be any fire in the lighter when we are alongside steamer or when carrying cargo from the steamer. I put out the fire by throwing sea-water on it. The fire was made on some sand in a dealwood box and kept at the stern of the lighter inside the covered portion. I did not see anyone smoking on the lighter at any time. When the lighter reached the steamer there was no light, fire or matches on board. I heard a loud noise first. I did not see any fire before I heard the noise. At this time I was on the steamer. On the lighter there were Susai, Jesuadia, Ponnaya (now in hospital) and the boy Paul. At this time they were loading casks into the lighter which were stored in the fore part. Susai and Jesuadia were in the fore part attending to the casks. Ponnaya (now in hospital, and the boy Paul were hauling on the rope which held the lighter to the steamer. I think the fire was caused by the bursting of a cask. I did not see anyone eating anything while the lighter was alongside the steamer.

Ponnaya Nadan, son of Tiruvadi Nadan.—States that on the 4th November I was on lighter No. 23. We left the shore at 6 o' clock and at once started to cook our food. Tindal Ponnaya Villavarayan was not on board that day. The man who has just made a statement

was in charge, I do not know his name. I call him Seepupillai. The fire was lighted by the boy Paul with matches. I was also with him. The boy then put the box of matches in a bag. The Tindal told me to take the box out of the bag and throw it away. I did so. This was about the time we passed the island. When cooking was finished I put out the fire with sea-water and threw the ashes overboard. This was as soon as we passed the island about three miles from the steamer. The food was eaten before we reached the island. I did not see anybody smoking at any time on board the lighter. I know that there should not be any fire or light in the boat when we are alongside the steamer. I first heard a loud noise. I did not see any fire before I heard the noise. At this time I was on the steamer. They were loading casks into the lighter in the fore part. Jesuadia and Susai were attending to the casks in the lighter. Ponnaya (now in hospital) and boy Paul were at the aft end of the lighter. Ponnaya was asleep on the top of the covered-in portion, Paul sitting down below getting a line ready for fishing. I do not know the cause of the fire.

Ponnaya Nadan, son of Kundaswami Nadan (now in hospital) states :—I was on No. 23 boat on the 4th November. The boat left the shore at about 6 A.M. and we then started to cook. I lighted the fire. It was made of wood. I lit the fire with matches. When I had lighted the fire I took the match box and wrapped it in a piece of canvas and then put it into the gunny bag which was in a room in the aft part of the boat. I did not see anyone smoking at any time in the boat. When cooking was finished I put out the fire by throwing sea-water on it and threw the ashes into the sea about a mile before we reached the steamer. I had a meal on the way to the steamer. When we got to the steamer we loaded drums. After this one man who was working as a cooly on the steamer had some of the food that remained.

The boat was then moved to the fore part of the steamer. I then felt giddy and went to sleep at the stern of the boat. The boy Paul was fishing at the stern of the boat. I do not know what other men were in the boat. I was awake by a loud noise. I got up and saw both the boat and the steamer burning. I did not see any cheroots, tobacco or bidies on board.

Paul, about ten years old, son of Soosai Michael, states :—On 4th November I went in boat No. 23. We left the shore before sunrise and then were cooking. Ponnaya (lying in the hospital) made the fire. He lighted the fire with a match and put the box in a bag being in the cornered part at the stern of the boat. We were cooking for about a quarter of an hour and nearing the island. After we had reached the island, Ponnaya, son of Tiruvadi Nadan, ordered Ponnaya (now lying in the hospital) to quench the fire with water and threw it into the sea. He did so. I saw him doing it. He threw all the ashes into the water. Just before nearing the island the box of matches was thrown into the sea by Ponnaya, son of Tiruvadi Nadan. He knew that the matches were in the bag because it is the usual place in the boat where they are kept. I did not see anyone in the boat smoking after the meal. The crew of the boat do sometimes smoke in the boat. After we had our meal there was some of the food left. After the drums of petrol had been stowed in the boat three coolies came off the steamer and ate some of the food that was left in the boat. They were sitting in the stern of the boat. They did not make a fire or warm the food.

Shortly before the explosion occurred the three coolies went back to the steamer. They had no matches nor cheroots. They had betel leaves. They were chewing betel leaves after their meal. They did not smoke. I heard a loud noise. I was then at the stern of the boat fishing, but at this moment I was below getting some betel and nuts from the covered portion for my father who was in the front part of the boat. There was no one else in this place. Ponnaya (now in hospital) was at this time carrying ropes. After I heard the noise I saw flames. I do not smoke at all. Ponnaya (now in hospital) is the cook. I am his assistant. Ponnaya brought the matches on to the boat that morning. I do not know whether he is in the habit of smoking or not.

8, HASTINGS STREET

CALCUTTA
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Indian Petroleum Act (VIII of 1899)

SIXTEENTH ANNUAL REPORT

OF THE

Chief Inspector of Explosives in India

BEING HIS ANNUAL REPORT FOR THE YEAR ENDING 31st MARCH 1915

SIMLA
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No 710.

FROM

LIEUT.-COLONEL C. A. MUSPRATT-WILLIAMS, R.A.,
Chief Inspector of Explosives in India.

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,
DEPARTMENT OF COMMERCE AND INDUSTRY.

Simla, the 30th April 1915.

SIR,

I have the honour to submit herewith a report of the work of my Department during the year ending 31st March 1915.

Personnel.

2. Captain J. S. Rush, Inspector of Explosives, who was granted eight months' combined leave from 12th March 1914, was ordered to return to duty before the expiry of his leave, and took over charge from Conductor J. H. Allen, on the 7th September 1914, who had been acting for him.

During the year the Government of India sanctioned the post of Personal Assistant to the Chief Inspector of Explosives, for which I had been asking for some years, and this appointment has considerably increased the efficiency of the Department. Mr. S E. Bird, who was Head Assistant in the office, and who has been in this Department since its creation in 1898, was appointed to the post.

Number of magazines.

3. During the year 1914, 192 licenses (twenty more than in the previous year) were granted in British India under Rule 16 of the Indian Explosives Rules 1914. The number of magazines licensed was 254 or nineteen more than in 1913, and is in excess of the number of licenses granted, because in a number of cases firms have two or more magazines in one place under one license. A statement showing the number and location of the magazines and also the number of licenses granted in British India during the year 1914 is given in Appendix A, and a statement showing the number of magazines and licenses granted during the past ten years is shown in Appendix B.

Inspection of explosives magazines during the year.

4. During the year, 336 inspections of magazines were made; a number of magazines being inspected two or three times. Those magazines are inspected most frequently which are situated in the neighbourhood of towns or in populous localities, or which contain large quantities of explosives, or any explosive which on account of its greater susceptibility to decomposition and consequent ignition, it is considered advisable to examine and test more frequently than other explosives. The Roburite Factory at Karachi was also inspected.

Condition of magazines.

5. The magazines generally are in good order, and as usual magazine owners have been found most willing to carry out recommendations even when involving considerable expense, and my thanks are due to them for making my duties easy in this respect.

Condition of explosives in magazines.

6. In last year's report I brought to notice an unenviable record, *viz.*, that a very much larger quantity of High Explosives had to be destroyed owing to deterioration than in any previous year. I am glad to say that there has been considerable improvement this year. At the beginning of November 1914 I inspected the magazines at Karachi and in one magazine I found several cartridges of dynamite, which had only lately been manufactured and imported, exuding nitro-glycerine, and, as I thought that this deterioration was likely to spread in a short time, I ordered Captain Rush, Inspector of Explosives, to proceed to Karachi about 6 weeks later to overhaul and examine the whole stock in the magazine, with the result that 65 cases of dynamite were found to be exuding so badly that this amount had to be destroyed. As it is a most unusual occurrence for dynamite to deteriorate after such a short time in this country, I made enquiries from manufacturers and have ascertained, as I anticipated would be the case, that it is due to the quality of the Kiesulguhr that had to be used owing to the war, which has cut off the supply of German Kiesulguhr and necessitated the substitution of Scottish Kiesulguhr, which is not as absorbent as the former. Consequently manufacturers will probably find it necessary to use a less proportion of nitro-glycerine in future supplies so as to compensate for the loss of absorptive power in the Scottish Kiesulguhr.

During the year the site, on which the Roburite Factory at Karachi was situated, was required by the Karachi Municipality and was acquired under the Land Acquisition Act, and consequently the stock of 5,245 lbs. Roburite and 20,480 detonators in that factory, which could not be disposed of by sale, had to be destroyed, as the Roburite Company did not consider it advisable to acquire another site and continue manufacture.

In addition to the defective explosives referred to above, the following explosives were found to have deteriorated or have become defective and were destroyed :—

(*a*) 391 lbs. of fireworks from the Calcutta Port Commissioner's magazine at Mayapur.

(*b*) 112 lbs. of gunpowder from the Equitable Coal Company's magazine at Deshergurh.

(*c*) 1 dynamite cartridge from Messrs. Gillanders Arbuthnot and Company's magazine at Charanpur.

(*d*) 2,648 detonators from Mr. Ormsby's magazine at Jevra.

(*e*) 16 barrels blasting powder from Messrs. Finlay Fleming and Company's magazine at Syriam.

(*f*) 24 signal rockets from Mohomed Ali Noorbhoy's magazine at Bombay.

(*g*) 20 cases crackers from Messrs. Currimbhoy Ebrahim and Company's magazine at Sewri.

(*h*) 20 cases amorces from Messrs. Gulam Hussein Alibhoy and Sons' magazine at Gopitank.

(*i*) 40,000 old sporting cartridges from Messrs. Gillanders Arbuthnot and Company's magazine at Bally.

(*j*) 51,000 packets of fireworks from Messrs. C. Abboy Chetty and Sons' magazine at Madras.

(*k*) 350 lbs. of wet dynamite from Messrs. Ewart Ryrie and Company's magazine at Karachi.

(*l*) 100 lbs. of wet dynamite from Messrs. Best and Company's magazine at Madras.

(*m*) 340 lbs. of gelignite from Messrs. Ewart Latham and Company's magazines at Bombay.

(*n*) 360 cartridges, for small arms,
102 detonators,
24 cartridges dynamite and
28 coils safety fuse,
} lying in the Dhanbaid Malikana were, under instructions from the District Authority, destroyed by the Inspector of Explosives.

(*o*) 75 coils of safety fuse from Messrs. Gillanders Arbuthnot and Company's magazine at Giridhi.

(*p*) $6\frac{3}{4}$ lbs. of dynamite from the G. I. P. Railway magazine at Dhond.

(*q*) 21,000 coils of safety fuse from the Ballarpur Colliery magazine at Ballarpur.

(*r*) 1 bundle rocket sticks, 38 boxes and 4 packages of fireworks, } from the Calcutta Port Commissioners' magazine at Mayapur.

(*s*) 12 coils of safety fuse from the East Indian Railway Company's magazine at Jakhim.

(*t*) 13 coils of safety fuse from Messrs. F. F. Christern and Company's magazine at Domchanch.

(*u*) 50 lbs of gunpowder from the Lodna Colliery Company's magazine at Bhaga.

Thefts.

7. During the year under report no thefts of explosives were reported to this office.

Import of explosives.

8. Two thousand two hundred and sixty-six tons of explosives were imported into British India during the year 1914, the value being Rs. 22,76,968. Full details showing the different kinds of explosives imported, and the value of each are given in Appendix C. From this Appendix it will be seen that though the value of fireworks imported into Bengal is given, the quantity imported is not shown, as the Collector of Customs states that the quantity imported is not recorded in his office. A comparative statement showing the quantity of explosives imported during the last ten years is given in Appendix D.

Authorised explosives.

9. A list of explosives at present authorised for importation into British India for general sale has been published in the *Gazette of India* for information. This list will be found in Appendix E.

PETROLEUM.

Number of petroleum installations.

10. During the year under report, 703 licenses for the storage of non-dangerous petroleum, regarding which this department was concerned or consulted, were granted. This is an increase of 35 as compared with last year. A list of these installations, corrected up to 31st December 1914, and showing the districts in which they are located, is given in Appendix F, and a statement showing the number of licenses granted during the past ten years, is given in Appendix G. In addition to the number of licenses shown in Appendix F, there are, of course, a very large number of storage godowns for the possession of non-dangerous petroleum in non-bulk, licensed by District Officers, of which this department has no cognizance.

Dangerous petroleum godowns.

11. There are also a number of godowns licensed for the storage of dangerous petroleum in non-bulk throughout the country, and the Inspectors of Explosives and I have inspected a number of these, when their existence has been brought to our notice, or where they are near non-dangerous petroleum installations or contain more than 500 gallons of petrol.

Inspection of petroleum installations during the year.

12. During the year the Chief Inspector of Explosives personally visited the large bulk oil installations at Madras Bombay, Karachi, Calcutta, (Budge Budge and Narculdanga), Chittagong and Rangoon, and also the oil fields of Burma and Assam. He in addition, inspected a number of minor installations. In all 783 inspections of non-dangerous petroleum premises were made. One hundred and ninety inspections of dangerous petroleum godowns were also made by this department.

13. The large petroleum installations are usually under efficient European supervision, and are in good order and well looked after.

Condition of major installations.

14. The small or minor petroleum installations are installations in which not more than 50,000 gallons of kerosene oil in combined bulk and non-bulk are stored, and are looked after by Indian Agents, employed by the large oil firms. The oil for these installations is supplied from the major installations at the different ports, and the retail trâde is carried out in them A great deal of inspection of these minor installations has been done by this Department during the last nine years, with the result that their condition is very much improved and the generality of them are in very good order. As a matter of fact when an installation is found not up to the mark at an inspection, it is usually due to the fact that some new Agent has been recently appointed who has not realised what is required of him. The oil companies do not hesitate to change their agents if several unsatisfactory reports are made of the installations under their charge.

Condition of minor installations.

15. During the year 1914, 105,053,631 gallons of non-dangerous petroleum and 50,095 gallons of dangerous petroleum were imported by sea into British India. The details are given in Appendix H and also the quantiy of non-dangerous and dangerous petroleum produced in Assam and Burma during the year, as well as during the past ten years.

Import of petroleum.

ACCIDENTS.

16. A list of accidents, with a short account of each, that have occurred with explosives, inflammable substances, dangerous goods, etc., between the 1st January and 31st December 1914, and that have been reported to this Department is given in Appendix I. It will be seen from a perusal of the details that the accidents have practically all been caused by gross neglect of ordinary precautions. In all there were 27 accidents causing 23 deaths and injuries to 42 persons. Comparative statements given in Appendices J and K show the total number of accidents and the number of persons killed or injured by them during the last nine years. As stated in previous reports, it is very doubtful whether all accidents that occur are duly reported to this Department and, therefore, it is very possible that the statistics given are underestimated. I notice that in some parts of India accidents appear more prevalent than in others ; but I am inclined to think that such difference may be occasioned by the local authorities in some places being more careful in carrying out instructions to report accidents than they are in others. There have been fewer persons killed and injured in the year under report than in any previous year, but I do not feel I can depend upon the correctness of these statistics for the reasons given above.

Number of accidents.

17. There were eight accidents from gunpowder during the year, causing six deaths and injuries to seven persons.

Gunpowder, Class I.

18. Nitro-compounds were responsible for three accidents, from which five persons were injured.

Nitro-Compounds, Class III.

19. There were no accidents from ammunition reported.

Ammunition, Class VI.

20. Six accidents from fireworks caused the death of five persons, and injuries to twenty-one others. It will be noticed from the details of the accidents that some of these were caused by Sulphur Chlorate mixtures, the use of which is now prohibited, and as stated in my last report, if this prohibition is strictly enforced, there is no doubt the number of accidents from fireworks will be considerably reduced.

Fireworks, Class VII.

Petroleum.

21. There were nine accidents from petroleum during the year, which were responsible for eleven deaths and injuries to nine persons. It will be seen from a perusal of the accidents in Appendix I, that carelessness is a prominent feature in most of them. In India the petroleum accidents are caused usually by lights being brought into proximity to oil vapour, to kerosene lamps being upset or falling down and to kerosene being poured on to fires or into lighted lamps.

Chemicals.

22. There were no accidents from chemicals reported during the year.

Miscellaneous accidents.

23. One accident from miscellaneous dangerous articles and substances was responsible for the death of one person.

Government accidents.

24. One accident was reported to this Department whereby seven persons were killed and one injured. The accident was due to an explosion in a contractor's magazine belonging to the Public Works Department which contained gunpowder, nitro-compounds, detonators and fuse. A Magisterial enquiry was held but no definite cause for the explosion could be ascertained. From my experience of the state of magazines of this kind, I should say it was probably due to some negligence which did not come out in the evidence.

GENERAL REMARKS.

Government magazines in charge of civil officers.

25. As mentioned in paragraph 26 of my last year's report, in some Government magazines in charge of civil officers there was found to be a lack of proper supervision and ignorance of the conditions in which a magazine should be kept, in consequence of which accidents had occurred, and the question of bringing these magazines under the jurisdiction of this Department has been under the consideration of the Government of India, and it was decided that these magazines should be inspected by the officers concerned, a copy of their reports on a special form being sent to this office in order that advice may be given on any irregularities that may be noticed. At the request of the Railway Board, State Railway magazines are now inspected by this Department.

Encroachments of distances round petroleum installations.

26. Under the Explosives and Petroleum Rules certain varying distances or danger zones have to be kept clear round magazines and petroleum installations and storage godowns. Where say, any two or more of the above items are situated together in the same locality, it is manifest that the danger zone to be kept clear between them must be that due to the item which requires the greatest distance. For example, if an explosive magazine is in existence which requires a danger zone of 400 yards round it, and it is desired to establish a petroleum installation, which only requires a danger zone of say 50 yards round it in the same neighbourhood, that installation cannot be placed closer than 400 yards to this magazine. As from inspections by this Department it has been found that this condition has not been invariably observed by licensing authorities, I thought it advisable to address Local Governments and also firms concerned on the subject. A copy of my letter to Local Governments will be found in Appendix L.

Leakage in petrol drums.

27. During my tours I have had a good many complaints from consumers of petrol and from retail dealers about the leakage of petrol in drums. This leakage is due to blows received during transit which result in bulges or dents in the drums causing leakage at the seams or turn over at top and bottom. Consequently I have addressed all the oil firms asking them to try and improve the manufacture of these drums, and I have also written to the Railway Board asking them to be kind enough to issue instructions to Railway Companies to ask their employés to be more careful in the loading of explosive and dangerous goods, as I have on several occasions seen some rather rough handling, and the Railway Board have taken action in the matter.

The storage of dangerous petroleum in bulk.

28. Under the Petroleum Rules licenses can be granted under Form D for the storage of non-dangerous petroleum in major installations in bulk and under

Form P for similar installations for storage of dangerous petroleum in bulk, the danger zone in the case of the latter being greater than in the case of the former but the tanks for both kinds of petroleum can be of similar construction, that is, not gas-tight, and with the top of the tank lightly rivetted on, so that it can be easily displaced. During the year the Principals of the Asiatic Petroleum Company, Limited, and the Burmah Oil Company, Limited, addressed me as follows:—

"Under clause 10 of the conditions relating to storage of dangerous petroleum as embodied in the endorsement on license Form P we have the honour to request that the distances between tanks, and between tanks and other buildings, in the case of our proposed bulk petrol and benzine depôts, may be reduced to the limits at present in force in the case of non-dangerous petroleum in major installations, on the following grounds:—

The equipment of these bulk depôts for bulk petrol and benzine has been most carefully considered by the Principals of the Asiatic Petroleum Company and Burmah Oil Company at home, and it has been decided to erect the depôts on the latest and most approved lines now in force in Great Britain. Special gas-tight tanks will be provided with special arrangements for disposal of all gas and each tank will be fitted with fire sprinklers which can be turned on immediately from a valve situated at some distance from the tanks. We enclose plans showing the nature of the tanks which it is proposed to erect, also the special arrangements for disposal of gas.

These special precautions together with the fire sprinklers on the tanks practically obviate any possible risk of fire or other mishap, and in all the principal installations at home the distances between tanks are now only some 20 to 25 feet and the distances between tanks and other buildings correspondingly small.

Experience has shown that with the above precautions the above distances have proved quite adequate at home where the installations are, in many instances, situated in busy centres and in close proximity to other buildings and valuable property, etc.

Very stringent rules in regard to the working and management of all bulk installations will of course be enforced and with the above special precautions in the matter of tanks, etc., we are confident that the distances in force in the case of non-dangerous petroleum are more than ample safeguards and we would ask that the distances laid down in the endorsement on License Form P may be reduced to this extent. They will still be some four times as great as those now in force at home."

And I replied as below:—

"I have the honour to state that I have carefully considered the proposals made in your joint letter of the 2nd November 1914 in which you ask that the distances laid down in the conditions of license Form P for the storage of dangerous petroleum in bulk, may, in the case of your petrol and benzine installations be reduced between tanks, and between tanks and other buildings to the limits at present in force in Form D in the case of non-dangerous petroleum in major installations; provided that in place of the ordinary tanks now in vogue you use the special gas-tight tanks in use in England which are supplied with special arrangements for the disposal of all gas and fitted with fire sprinklers which can be turned on immediately from a valve situated at some distance from the tank. As I know that you are experiencing great difficulty in getting sufficient ground at the large ports to comply with the present regulations for the storage of dangerous petroleum in the class of tank at present in use in India, and, as I am of opinion that greater safety will be obtained by the use of these special gas-tight tanks fitted with sprinklers and arrangements for disposal of gas, and as the distances to be observed between tanks, and between tanks and buildings, will still be considerably greater than is considered necessary for safety in England, I write to say that in the case of the storage of dangerous petroleum in bulk at the ports of Calcutta, Bombay, Madras and Karachi, where it is possible to have establishments which can efficiently supervise the special precautions you suggest, I am willing to recommend under the proviso to condition 10 of license Form P, provided the precautions mentioned above are carried out, that the distances

shall be reduced as suggested by you to those laid down for the storage of non-dangerous petroleum in bulk for major installations licensed in Form D.

Please understand, however, that there is no use applying to me for any further reduction in future as this is the minimum which I can possibly recommend. I am sending a copy of the correspondence for information to the Government of India, to the Bengal, Bombay and Madras Governments and to the Port Trusts, Calcutta, Bombay, Madras and Karachi.

2. The plans are herewith returned and I would ask the favour of being furnished with copies of these plans for retention in this office.

Bombardment of Madras by the German Cruiser "Emden".

29. On the evening of the 22nd September 1914, Madras was bombarded by the German Cruiser "Emden" and two large petroleum tanks belonging to the Burmah Oil Company containing 147,457 and 182,479 gallons respectively, were set on fire by the shells. The fire burnt itself out by about noon next day without spreading or leakage from the bunds surrounding the tanks. I mention this, as it serves to show that the precautions regarding distances to be kept clear as laid down in the Indian Petroleum Rules are sufficient as no other tanks nor a building for the storage of dangerous petroleum belonging to the Burmah Oil Company caught fire from the burning tanks.

Question of susceptibility of unrefined paraffin wax to spontaneous combustion.

30. A consignment of 25 tons unrefined paraffin wax belonging to the Assam Oil Company packed in gunny bags took fire two days after loading in a steam vessel belonging to the River Steam Navigation Company, which was conveying it from Assam to Calcutta. The owners of the steamer wrote to me to give an opinion as to the chances of spontaneous combustion as the conflagation could not be attributed to incendiarism and there were no other inflammable substances in the holds and all precautions had been taken to prevent a light or naked flame communicating with the wax, so that the origin of the fire appeared a mystery. In reply I stated that unrefined wax or paraffin scale was a solid product left after the extraction of all the petroleum spirits, illuminating and lubricatin oils by distillation from the crude petroleum and that by itself I did not consider it was in any way subject to spontaneous combustion, but that I was inclined to think there was a possibility of such spontaneous ignition taking place when the wax was packed in gunny bags, as it is a well known fact that oily cotton, hemp and jute are subject of spontaneous combustion from the fact that they take up oxygen from the air, giving rise to heat, especially if they are placed in a warm place like a hold, and that the gunny bags containing the wax would probably get greasy from the wax in the hold, where they would be in close contact and rubbed against one another, and ignition might take place. I recommended the Steamer Company to consult a good practical chemist on the subject, which was done, and the chemist consulted considered that the gunny bags might cause spontaneous combustion if they were "damp". High grade wax is generally packed in gunny bags and it was of considerable importance that the matter should be decided conclusively, as otherwise Inland steamers might ban such cargo except as a "deck" one. Consequently the Assam Oil Company thought it advisable to refer the whole case to Sir Boverton Redwood, who is the great English authority, and that Company has begged me to make public in my Annual Report the opinion given by him. Sir Boverton Redwood says: "As the Chief Inspector of Explosives has already authoritatively and correctly stated that paraffin wax cannot be in any way subject to spontaneous combustion and his statement is supported by that of the Analytical Chemist, it is unnecessary for me to say anything on that point. As regards the suggestion that oily gunny bags containing paraffin wax might spontaneously ignite if packed in the hold of a vessel, I may remark that only an oxidisable "fixed" oil, not a mineral oil, could render the vegetable fibre liable to ignite spontaneously, and that any solid or semi-solid hydro-carbon which might exude from the paraffin wax would render even damp gunny bags less liable to spontaneous heating and would therefore act as a protective agent. In view of the condition in which the damaged parcel of wax is reported to have been discharged, I do not think there is any evidence that the fire can be attributed to the spontaneous ignition of the gunny bags, and it follows that in my opinion there is no ground for prohibiting the use of gunny bags for the purpose."

31. On account of the war there has been a failure of supplies of nitrate of potash and manufacturers in England have consequently been compelled to substitute nitrate of soda in gelignite and gelatine dynamite, and have asked me to allow this substitution in consignments of their explosives for this country. I have agreed to this provided the packets are dipped in paraffin wax and that water proof cartridge paper is used as an additional safeguard.

Failure of supplies of nitrate of potash owing to the war.

32. Major Cooper Key, His Majesty's Chief Inspector of Explosives in England has just published a very useful primer on the storage of Petroleum Spirit and Carbide of Calcium for the use of Local Inspectors and Motorists and on page 24 of this Manual he gives advice to chauffeurs in the form of "Don'ts" which I have taken the liberty to publish below, as they will serve to show the danger of carelessness with petrol.

Advice to chauffeurs.

Don't leave empty petrol tins lying about the garage. Screw on the caps securely and keep the tins together in a safe place.

Don't smoke while pouring petrol into the tank. It may not be imminently dangerous, but it may be done once too often.

Don't use an open light to see if there is sufficient petrol in the tank.

Don't forget that petroleum vapour is much heavier than air and will consequently "creep" a considerable distance to a fire or light. This does not mean that there is no danger from a light at some height above the ground.

Don't throw petrol down a drain.

Don't use a repair "pit" until it has been ascertained that there is no possibility of spirit or vapour finding its way into the "pit".

Don't allow petrol to be taken into the house for cleaning purposes.

Don't throw water on burning petrol. It will only spread the fire. Sand is good, but is bad for machinery. A rug or coat is better. An asbestos blanket is best. Some of the patent extinguishers are also good.

33. The number of inspections done by this Department during the year were 1,309. To give some idea of the work and the ground covered, I give the following details.

Number of inspections made.

During the 12 months, 1st April 1914 to 31st March 1915, the Chief Inspector of Explosives was away from Headquarters on inspection duty for 169 days, and travelled 24,840 miles, the two Inspectors at Calcutta and Bombay were away for 206 days and 293 days and travelled 29,167 and 32,315 miles, respectively.

During the year the Chief Inspector of Explosives and also the two Inspectors had a good deal of additional work in connection with outrages.

34. In conclusion, I owe my grateful thanks to my Inspectors for the able assistance they have given me, and I cannot speak too highly of their services.

I have the honour to be,

SIR,

Your most obedient Servant,

C. A. MUSPRATT-WILLIAMS, *Lieut.-Col., R. A.*,

Chief Inspector of Explosives in India.

APPENDIX A.

List of Magazines and Licenses granted under Rule 46 of the Indian Explosives Rules, 1914, for the year 1914.

Presidency or Province.	District.	Magazines.			Licenses.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Assam	Cachar	2	...	2	1	...	1
	Lakhimpur	1	...	1	1	...	1
	Nowgong	...	1	1	...	1	1
	Total	3	1	4	2	1	3
Bengal	Burdwan	20	2	22	17	2	19
	Darjeeling	3	...	3	3	...	3
	Hooghly	4	...	4	1	...	1
	Howrah	1	...	1	1	...	1
	24-Parganas	2	...	2	1	...	1
	Total	30	2	32	23	2	25
Bihar and Orissa	Gaya	3	...	3	3	...	3
	Hazaribagh	13	...	13	10	...	10
	Manbhum	19	2	21	16	2	18
	Sambalpur	1	...	1	1	...	1
	Singbhum	3	...	3	2	...	2
	Total	39	2	41	32	2	34
Bombay	Ahmedabad	4	1	5	4	1	5
	Bombay	19	...	19	12	...	12
	Karachi*	5	...	5	3	...	3
	Kolaba	1	...	1	1	...	1
	Panch Mahals	2	...	2	2	...	2
	Poona	6	2	8	4	1	5
	Ratnagiri	...	1	1	...	1	1
	Surat	3	4	7	2	3	5
	Thana	...	1	1	...	1	1
	Total	40	9	49	28	7	35
Burma	Bassein	1	...	1	1	...	1
	Hanthawaddy	4	...	4	3	...	3
	Mandalay	2	...	2	1	...	1
	Mergui	1	...	1	1	...	1
	Pegu	1	...	1	1	...	1
	Ruby Mines	1	...	1	1	...	1
	Tavoy	10	2	12	6	1	7
	Thaton	...	2	2	...	2	2
	Total	20	4	24	14	3	17

* At Karachi there was in addition a Roburite Factory licensed under Article 10 of Schedule II of the Indian Explosives Rules, 1914.

APPENDIX A—*contd.*

List of Magazines and Licenses granted under Rule 46 of the Indian Explosives Rules, 1914, for the year 1914—*contd.*

Presidency or Province.	District.	Magazines.			Licenses.		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Central Provinces	Balaghat	2	...	2	2	...	2
	Petul	2	1	3	1	2*	3
	Bhandara	2	1	3	2	1	3
	Bilaspur	1	...	1	1	...	1
	Chanda	1	...	1	1	...	1
	Chhindwara	6	...	6	4	...	4
	Jubbulpur	4	...	4	2	...	2
	Nagpur	6	...	6	6	...	6
	Narsingpur	2	...	2	1	...	1
	Raipur	3	...	3	4	...	4
	Yeotmal	...	1	1	...	1	1
	Total	29	3	32	24	4	28
Coorg	Mercara	1	...	1	1	...	1
	Total	1	...	1	1	...	1
Delhi	Malcha	...	2	2	...	1	1
	Total	...	2	2	...	1	1
Madras	Anantapur	6	...	6	4	...	4
	Chingleput	2	...	2	2	...	2
	Madras	22	2	24	7	2	9
	Madura	1	...	1	1	...	1
	Nellore	6	...	6	3	...	3
	North Arcot	...	1	1	...	1	1
	Nilgiris	2	...	2	1	...	1
	Salem	1	1	2	1	1	2
	South Arcot	1	...	1	1	...	1
	Tanjore	6	6	12	6	6	12
	Tinnevelly	...	2	2	...	2	2
	Trichinopoly	2	...	2	2	...	2
	Vizagapatam	4	...	4	2	...	2
	Total	53	12	65	30	12	42
Ponjab	Rawal Pindi	1	...	1	1	...	1
	Total	1	...	1	1	...	1
United Provinces	Lucknow	1	...	1	1	...	1
	Meerut	1	...	1	3	...	3
	Shahjehanpur	1	...	1	1	...	1
	Total	3	...	3	5	...	5

* One of these icenses was granted temporarily to Messrs. Moylan and Scott to store Explosives in the Great Indian Peninsula Railway magazine at Jamti till their Magazine at Chilati was built.

SUMMARY.

Presidency or Province.	Magazines.			Licenses.		
	Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Assam	3	1	4	2	1	3
Bengal	30	2	32	23	2	25
Bihar and Orissa	39	2	41	32	2	34
Bombay	40	9	49	28	7	35
Burma	20	4	24	14	3	17
Central Provinces	29	3	32	24	4	28
Coorg	1	...	1	1	...	1
Delhi	...	2	2	...	1	1
Madras	53	12	65	30	12	42
Punjab	1	...	1	1	...	1
United Provinces	3	...	3	5	...	5
Total	219	35	254	160	32	192

APPENDIX B.

Summary of magazines and licenses granted under Rule 46 for the ten year ending 1914.

	Magazines.			Licenses.		
	Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
1905	139	15	154	95	13	108
1906	150	19	169	105	15	120
1907	164	9	173	118	8	126
1908	167	19	186	119	15	134
1909	178	29	207	128	21	149
1910	189	13	202	135	13	148
1911	190	27	217	139	19	158
1912	199	18	217	146	15	161
1913	210	25	235	151	21	172
1914	219	35	254	160	32	192

APPENDIX C.

Statement showing the imports of explosives by sea into British India from other countries in the year 1914.

—	Bengal.	Bombay.	Sind.	Burma.	Madras.	Total.
Quantity.						
Gunpowder, black . . . . . lbs.	78,845	44,979	86,270	13,702	17,025	2,40,821
„ smokeless . . . . . „	6,130	2,295	2,640	150	650	11,865
Dynamite . . . . . „	212,576	137,500	6,000	69,750	91,250	517,076
Blasting gelatine . . . . . „	24,976	48,450	...	23,000	530,600	627,026
Gelignite or gelatine dynamite . . . „	5,040	113,150	10,000	36,000	37,000	201,190
Other nitro-compound explosives . . . „	91,840	...	...	500	190,463	282,803
Detonators . . . . . No.	727,250	610,250	50,000	451,400	2,490,000	4,328,900
Fireworks . . . . . lbs.	...	2,170,500	90,601	388,244	2,516	2,651,861
Total „	419,407	2,516,874	195,511	531,346	869,504	4,532,642
Total No.	727,250	610,250	50,000	451,400	2,490,000	4,328,900
Value in rupees.						
Gunpowder, black	59,343	24,108	37,520	7,408	12,852	141,231
„ smokeless	18,498	7,202	3,594	515	2,071	31,880
Dynamite	97,736	109,667	4,766	68,273	72,125	352,567
Blasting gelatine	23,962	42,444	...	28,192	482,980	577,578
Gelignite or gelatine dynamite	4,026	85,511	7,937	34,740	30,424	162,638
Other nitro-compound explosives	60,096	...	...	320	161,839	222,255
Detonators	19,786	10,736	782	17,007	42,434	90,745
Fireworks	106,253	444,858	21,688	122,854	2,421	698,074
Total .	389,700	724,526	76,287	279,309	807,146	2,276,968

APPENDIX D.

Comparative statement showing the imports of explosives by sea into British India from other countries for the ten years ending 1914.

—	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.
Gunpowder, black . . lbs.	202,751	168,353	170,299	256,753	213,854	242,702	229,069	384,883	213,713	240,821
„ smokeless . „	45,125½	39,745	29,317	37,615	39,412	38,176	29,611	17,625	21,470	11,865
Ammonal . . . „	...	...	...	250	...	...	7,800	...	...	...
Dynamite . . . „	249,968	352,207	262,495	350,474	453,016	360,636	389,577	280,900	431,306	517,076
Blasting gelatine . . „	558,200	906,400	1,035,050	726,796	805,080	676,458	750,242	840,328	850,624	627,026
Gelignite or gelatine dynamite . . . „	123,048	132,594	175,040	165,208	132,032	178,968	226,034	314,344	262,548	201,190
Monobel powder . . „	...	2,000	...	...	...	...	...	...	...	...
Other nitro-compound explosives . . . „	109,475	72,921	89,256	77,616	48,016	96,736	43,456	224,425	277,792	282,803
Detonators . . . No.	1,797,000	5,536,000	3,052,400	3,062,000	5,206,275	2,687,556	3,216,789	3,649,010	5,928,850	4,328,900
Fireworks . . . lbs.	1,661,229	2,410,388	2,446,428	1,504,896	1,339,733	3,410,741	3,540,825	3,181,411	2,270,869	2,651,861
Total . lbs.	2,949,796½	4,084,608	4,257,885	3,119,608	3,031,143	5,004,417	5,216,614	5,243,916	4,328,322	4,532,642
Total . No.	1,797,000	5,536,000	3,052,400	3,062,000	5,206,275	2,687,556	3,216,789	3,649,010	5,928,850	4,328,900

APPENDIX E.

DEPARTMENT OF EXPLOSIVES.

NOTIFICATION.

Calcutta, the 2nd March 1915.

No. 459.—With reference to Notification No. 4013—33, dated the 6th June 1914, of the Government of India, Department of Commerce and Industry, publishing rules to regulate the manufacture, possession, sale, transport and importation of explosives, the following list of "authorised explosives" referred to in rule 4 (3) of the above rules is published for general information :—

LIST OF AUTHORISED EXPLOSIVES.

The following explosives are at present authorised for importation into British India, for general sale :—

Class 1.—GUNPOWDER.

GUNPOWDER.

Class 2.—NITRATE MIXTURE.

AMMONAL.

CHILWORTH SPECIAL POWDER.

Class 3.—NITRO-COMPOUND.

Every explosive in this class and every explosive ingredient thereof shall be so thoroughly purified and otherwise of such character as to satisfy a test known as the heat test, and specified in the rule for testing explosives, published with Notification No. 4013—33, dated the 6th June 1914, referred to above.

Division 1.

ARDEER GELIGNITE.
BALLISTITE.
BLASTING GELATINE.
CAMBRITE.
CARBONITE.
CELTITE.
CHILWORTH SMOKELESS POWDER No. 2.
CORDITE.
CORDITE, M. D.
DYNAMITE.
DYNOBEL.
FARMER'S DYNAMITE.
GELATINE DYNAMITE.
GELIGNITE.
MONOBEL POWDER.
PHŒNIX POWDER.
SAMSONITE.

Provided that every explosive in this division shall be of such character and consistency as not to be liable to liquefaction or exudation.

Division 2.

AMBERITE No. 2.
CHILWORTH SMOKELESS POWDER.
CHILWORTH SMOKELESS SPORTING POWDER.
E. C. SPORTING POWDER.
EMPIRE POWDER.
GUNCOTTON.
IDEAL POWDER.
IMPERIAL SCHULTZE GUNPOWDER.
NEGRO POWDER.
NEONITE.
NOBEL'S SPECIAL POWDER OR IDEAL POWDER
N. S. SMOKELESS.
PICRIC ACID.
PICRIC POWDER.
PRIMROSE SMOKELESS.
RENDITE.
ROBURITE.
RUBY POWDER.
SCHULTZE CUBE POWDER.
SCHULTZE GUNPOWDER.
SMOKELESS DIAMOND.
TONITE OR COTTON POWDER.

Class 4.—CHLORATE MIXTURE.

Nil.

Class 5.—FULMINATE.

Nil.

Class 6.—AMMUNITION.

Division 1.

Nobel's Safety Electric Time Fuze.	Safety Cartridges.
Percussion Caps.	Safety Fuzes for Blasting.
Railway Fog Signals.	Safety Electric Fuzes.

Division 2.

Cartridges for Cannon, Shells, Mines, Blasting or other like purposes.	Fuze lighters.
Cartridges for Small Arms which are not Safety Cartridges.	Fuzes for Shells.
Cordeau Bickford.	Instantaneous Fuze.
Electric Fuzes.	Port fires.
Filled Shells not containing their own means of ignition and closed by a substantial metal plug.	Tubes for firing Explosives.
	Quick match.
	War Rockets.

Division 3.

Cartridges for Small Arms which are not Safety Cartridges.	Nobel's Electric Detonator Time Fuze.
Detonators.	Primers.
Electric Detonators.	Quick firing Ammunition.
Friction Tubes.	Tubes for firing Explosives.
Fuzes for Shells.	

Class 7.—FIREWORK.

Division 1.

Nil.

Division 2—Manufactured Fireworks.

Manufactured Fireworks.	Magnesium Torches.
Aluminium Torches.	Pyrotechnic Matches.
Amorces.	Rockets.
Chinese Crackers.	Signal Lights.
Electric Sparklers.	

C. A. MUSPRATT-WILLIAMS, *Lieut.-Col., R.A.,*
Chief Inspector of Explosives in India.

APPENDIX F.

*List of non-dangerous petroleum installations licensed during the year 1914.

Province.	District.	No.	Province.	District.	No.
Ajmer-Merwara	Ajmer	4	Bengal	Backergunge	1
	Total	4		Bankura	1
Assam	Darrang	1		Bogra	4
	Kamrup	2		Birbhum	1
	Lakhimpur	2		Burdwan	7
	Total	5		Calcutta	4
Baluchistan	Quetta	3		Chittagong	5
	Total	3		Darjeeling	3
				Dinajpur	3
				Howrah	4
				Jalpaiguri	2
				Khulna	2
				Midnapur	3

* This list includes godowns for the storage of non-dangerous petroleum regarding which this Department has cognizance.

APPENDIX F—*contd.*

* List of non-dangerous petroleum installations licensed during the year 1914—*contd.*

Province.	District.	No.
Bengal—(*concld.*)	Murshidabad	1
	Nadia	7
	Patna	3
	Rajshaye	3
	Rangpur	8
	24-Parganas	9
	Total	71
Bihar and Orissa	Balasore	3
	Bhagalpur	6
	Champaran	4
	Cuttack	4
	Darbhanga	3
	Gaya	5
	Manbhum	4
	Monghyr	3
	Muzufferpur	5
	Patna	5
	Purnea	6
	Ranchi	1
	Sambalpur	7
	Saran	3
	Shahabad	3
	Santhal Parganas	6
	Total	68
Bombay	Ahmedabad	5
	Ahmednagar	3
	Belgaum	4
	Bijapur	6
	Bombay	8
	Broach	8
	Dharwar	12
	Hyderabad (Sind)	1
	Karachi	9
	East Khandesh	4
	West Khandesh	6
	Nasik	8
	Poona	4
	Satara	3
	Sholapur	3
	Surat	6
	Thana	4
	Total	94
Burma	Hanthawaddy	7
	Magwe	14
	Mandalay	6
	Minbu	9
	Mingyin	2
	Pokoku	7
	Prome	6
	Thayetmyo	2
	Total	53
Central Provinces	Akola	6
	Amraoti	9
	Bhandara	7
	Bilaspur	3
	Buldana	10
	Chanda	3
	Hoshangabad	5
	Jubbulpore	6
	Nagpur	5
	Narsingpur	3
	Nimar (Khandwa)	5
	Raipur	6
	Saugor	3
	Seoni	3
	Wardha	9
	Total	83
Delhi	Delhi	7
	Total	7
Hyderabad	Hyderabad	11
	Secunderabad	3
	Total	14
Madras	Anantapur	5
	Bellary	5
	Chingleput	8
	Chittoor	2
	Coimbatore	7
	Cuddapah	2
	Ganjam	4
	Godavari	5
	Guntur	7
	Kistna	11

* This list includes godowns for the storage of non-dangerous petroleum regarding which this Department has cognizance.

APPENDIX F—*concld.*

* List of non-dangerous petroleum installations licensed during the year 1914—*concld.*

Province.	District.	No.
Madras—*concld.*	Kurnool	5
	Madras	6
	Madura	6
	Malabar	11
	Nellore	3
	North Arcot	10
	Ramnad	8
	Salem	3
	South Arcot	14
	South Canara	2
	Tanjore	21
	Tinnevelly	6
	Trichnopoly	7
	Vizagapatam	9
	Total	167
Mysore	Bangalore	11
	Total	11
North-West Frontier Province	Hazara	2
	Peshawar	4
	Total	6
Punjab	Ambala	8
	Amritsar	4
	Gurdaspur	2
	Jullundur	3
	Lahore	6
	Ludhiana	3
	Multan	1
	Rawal Pindi	3
	Shahpur	1
	Sialkot	4
	Total	35
United Provinces	Agra	4
	Aligarh	2
	Allahabad	8
	Azamgarh	2
	Bahraich	2
	Ballia	1
	Bara Banki	2
	Bareilly	4
	Basti	8
	Benares	4
	Bijnor	4
	Cawnpur	3
	Dehra Dun	1
	Etawah	3
	Fyzabad	3
	Ghazipur	2
	Gonda	2
	Gorakpur	3
	Jaunpur	1
	Jhansi	3
	Lucknow	3
	Meerut	4
	Moradabad	3
	Muttra	2
	Partabgarh	2
	Saharanpur	3
	Shahjahanpur	3
	Total	82

* This list includes godowns for the storage of non-dangerous petroleum regarding which this Department has cognizance.

SUMMARY.

	No.
Ajmer-Merwara	4
Assam	5
Baluchistan	3
Bengal	71
Bihar and Orissa	68
Bombay	94
Burma	53
Central Provinces	83
Delhi	7
Hyderabad	14
Madras	167
Mysore	11
North-West Frontier Province	6
Punjab	35
United Provinces	82
Total	703

APPENDIX G.

Summary of non-dangerous petroleum installations and godowns licensed for the ten years ending 1914.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.
Ajmer-Merwara	3	3	3	4	4	4	4	4	4	4
Assam	...	...	...	...	...	...	...	3	5	5
Baluchistan	...	...	1	1	1	1	2	2	3	3
Bengal	67	74	74	79	89	96	101	69	73	71
Bihar and Orissa	...	...	...	...	...	...	...	67	67	68
Bombay	65	64	76	82	79	84	83	86	88	94
Burma	10	11	12	17	19	33	35	41	46	53
Central Provinces	49	49	67	66	69	71	74	81	80	83
Delhi	...	...	...	...	...	...	...	...	6	7
Eastern Bengal and Assam ...	11	14	16	21	24	31	28	...	...	...
Hyderabad	...	...	...	...	...	2	11	12	14	14
Madras	49	57	89	97	95	114	129	138	151	167
Mysore	...	...	...	...	8	10	10	10	11	11
North-West Frontier Province ...	1	3	3	3	3	3	6	7	7	6
Punjab	9	12	23	26	28	30	35	39	34	35
United Provinces	44	44	47	48	59	61	65	71	79	82
Total ...	308	331	411	444	478	540	583	630	668	703

APPENDIX H.

Statement showing the quantity of petroleum imported by sea into British India during the ten years ending 1914.

NON-DANGEROUS PETROLEUM.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Chittagong	3,970,269	1,822,051	5,547,944	6,308,806	8,825,895	6,977,078	7,959,721	9,250,508	9,927,422	9,896,242
Balasore	10,000	26,200	...	...	...	...	...	...	...	...
Chandballi	367,500	405,000	270,200	206,150	208,200	259,000	227,400	256,800	306,000	366,000
Calcutta	27,144,014	20,342,078	27,342,923	33,379,196	26,599,239	18,642,248	27,089,471	26,463,283	28,720,828	39,903,619
Bombay	22,099,928	17,402,913	22,439,071	24,750,034	24,955,563	24,730,978	27,604,430	22,790,825	46,615,625	26,722,382
Sind	5,157,947	5,007,932	7,171,933	10,448,574	9,719,214	8,295,644	9,689,900	7,274,695	10,043,396	11,570,097
Madras	9,765,384	6,956,459	8,942,869	13,018,601	13,720,767	10,006,706	15,113,287	10,625,192	12,406,817	15,558,314
Burma	1,595,209	1,156,179	1,828,973	2,514,834	1,119,719	1,197,661	1,283,641	1,018,526	1,146,967	1,036,977
Total ...	70,110,251	53,118,812	73,543,913	90,626,195	85,148,597	70,109,315	88,967,450	77,684,829	109,167,055	105,053,631

APPENDIX H—*contd.*

Statement showing the quantity of petroleum imported by sea into British India during the ten years ending 1914—*contd.*

DANGEROUS PETROLEUM.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Calcutta	14,500	...	12,270	20,048	42,965	44,708	83,800	32,080	349	482
Bombay	66,017	184,243	92,258	110,390	84,793	79,661	106,000	469,522	772,666	48,060
Sind	622	9,795	2,733	25,801	1,844	28,043	3,827	6,185	8,574	1,534
Madras	7,828	38,104	25,400	53,756	15,280	6,459	2,400	4,120	...	...
Burma	5	...	...	...	55	580	206	426	240	20
Total .	88,972	232,142	132,661	209,995	144,937	159,451	196,233	512,333	781,829	50,096

Statement showing the quantity of petroleum produced in Burma and transported into British India duting the six years ending 1914.

	1909.	1910.	1911.	1912.	1913.	1914.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Non-dangerous petroleum	83,299,134	85,356,057	100,758,865	100,152,787	108,781,833	106,604,718
Dangerous petroleum	648,878	922,481	1,619,527	1,392,616	2,445,242	3,731,374

Statement showing the quantity of petroleum produced in Assam and Burma during the ten years ending 1914.

NON-DANGEROUS PETROLEUM.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Assam .	1,543,212	1,830,942	1,975,094	2,016,978	2,144,093	2,033,772	2,142,349	1,905,955	2,539,609	2,975,876
Burma .	67,062,170	95,848,500	75,397,762	78,044,435	134,080,703	143,387,116	148,874,019	161,250,234	184,616,944	178,313,761
Total .	68,605,382	97,739,442	77,372,856	80,061,413	136,224,796	145,420,888	151,016,368	163,156,189	187,156,553	181,289,637

DANGEROUS PETROLEUM.

	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Assam .	21,014	21,855	48,017	67,256	36,588	56,736	80,534	120,930	179,776	217,863
Burma .	11,988,220	11,670,200	15,043,700	18,055,500	18,479,394	18,245,501	21,228,403	23,109,393	32,375,142	32,281,848
Total .	12,009,234	11,692,055	15,091,717	18,122,756	18,515,982	18,302,237	21,308,937	23,230,323	32,554,918	32,499,711

APPENDIX I.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1914 to 31st December 1914.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained	Number of Persons.	
					Killed.	Injured.
1	1st January 1914 .	Gunpowder ...	Salem . . .	Five men were engaged in deepening a well. The explosive in one of the holes bored for the purpose of blasting having missed fire, one of the men stirred up the gunpowder with an iron rod, when the gun powder exploded seriously injuring him and one of the other men.	...	2
2	2nd February 1914 .	Gunpowder . .	Salem . . .	While blasting was going on in a well a charge misfired and two men poured water in the hopes of making the charge ineffective. They were apparently careless in the matter, for when one of them, subsequently hammered at a projecting piece of rock, near the hole in order to remove it, the powder exploded, seriously injuring one of the men.	...	1
3	7th April 1914 .	Gunpowder . .	Chandragin . .	While fireworks were being let off, a spark accidentally fell on some gunpowder, which exploded, with the result that one man was injured.	...	1
4	29th May 1914 .	Gunpowder . .	Danispet, Salem .	While two women were grinding gunpowder, it suddenly exploded injuring both of them. It is presumed there must have been some grit in the powder which caused the explosion.	...	2
5	July 1914 . .	Gunpowder . .	Karisalpatti, Dindigul	An Indian used a match for lighting cocoanut fibre rope. Sparks accidentally fell on some gunpowder near by which exploded causing fatal injuries to the man.	1	...
6	5th July 1914 .	Gunpowder . .	Coimbatore . .	While an Indian was by the light of a lamp untying a cloth in which gunpowder was kept, the lamp accidentally fell on the gunpowder which exploded, fatally injuring the man and another person who was near by and seriously injuring a third.	2	1
7	22nd September 1914.	Gunpowder . .	Peddapuram . .	While crackers were being manufactured, an earthen dish containing gunpowder suddenly exploded killing a man who was seated near it. It is presumed that either grit from the earthen dish caused the explosion or that some one was smoking in the vicinity.	1	...
8	5th November 1914.	Gunpowder . .	Tirumangalam, Madura.	A licensed manufacturer was manufacturing gunpowder in his house instead of manufacturing it in the place specified in the license. The powder suddenly exploded, with the result that the building fell down on him and he died. A lad who was there at the time also died from rafters falling on him as a result of the explosion.	2	...
				Total ...	6	7
9	13th January 1914.	Dynamite . .	Coorg . . .	While 2 coolies were jumping a hole in blasting operations an explosion occurred seriously injuring them. It is believed that the explosion was due to the proximity of an unexploded charge while the coolies were jumping the hole.	...	2
10	31st March 1914.	Dynamite .	Sedaw . .	Some coolies during blasting operations noticing the fuse of a cartridge had become detached, tried to remove the cartridge from a blast hole, with the result that the cartridge exploded and seriously injured two of them.	...	2

APPENDIX I—*contd.*

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1914 to 31st December 1914—*contd.*

EXPLOSIVES—*contd.*

No.	Date of accident.	Nature of explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
11	14th May 1914 .	Gelignite . .	Bombay . . .	An Indian servant found a gelignite cartridge with fuze attached in the room he was occupying and took it to his master to see what it was. The master not knowing the nature of the find, lit the fuse. Becoming alarmed at the manner in which the fuse burned, he told another servant to put it out with water. While this was being done the cartridge exploded shattering the hand of the servant.	...	1
				TOTAL .	...	5
12	6th February 1914 .	Fireworks .	Coconada .	While fireworks were being let off, a rocket which had been lighted came in contact with a bundle of rockets which another man was holding near by and all the rockets suddenly took fire, injuring ten persons, one of whom died from the effects of injuries received.	1	9
13	8th April 1914 .	Fireworks .	Tiruchatturai .	While a man was manufacturing fireworks consisting of gunpowder and iron dust, an explosion occurred fatally injuring two men and seriously injuring another. The licensee was fined for having an excess quantity of explosives in his possession.	2	1
14	1st June 1914 .	Fireworks consisting of gunpowder with chlorate of potash and sulphide of arsenic.	Chokkapalangarai, Tinnevelly.	An Indian was making Akasavanam (rockets). He placed some gunpowder in a small bamboo tube and over this placed a layer of chlorate of potash and sulphide of arsenic covering it with rags and squeezed the lot down with a small iron rod. During the process of squeezing an explosion occurred fatally injuring the man and slightly injuring two others.		2
15	3rd July 1914 .	Firework composition.	Calcutta . .	While an Indian lad was rubbing some firework composition it exploded fatally injuring him and two others who were near by. The ingredients of the composition could not be ascertained.	1	2
16	5th July 1914 .	Firework composition.	Montgomery .	Whilst an Indian was removing a mixture of sulphide of arsenic and chlorate of potash with a tea spoon from a jar, an explosion occurred injuring him and six others who were near by.	...	7
17	30th July 1914 .	Deck flares .	Moyapore .	Two tins out of two packages of deck flares got wet by rain and ignited, burning themselves out.	...	...
		PETROLEUM.				
				Total .	5	21
18	28th February 1914.	Petrol . .	Rangoon . .	The ships Cassab on board the S. S. "Bhadra" took a lighted cargo lamp into the forepeak of the vessel when an explosion occurred. The explosion was evidently due to ignition of the gas or fumes from the forepeak in which a variety of paints and oil were stored. The Cassab was fatally injured and two other persons slightly damaged.	1	2
19	16th April 1914 .	Petrol . .	Madras . .	An Indian at the Government Press, Madras, was filling a tank fixed to the wall with petrol from a can and had a blowpipe lamp which had been lit on the floor below. The petrol vapour from the can appears to have caught fire from the lamp. The flame reached petrol stored in some drums which were kept near the doorway of the room and set the building on fire. Four men were badly burnt.	...	4
20	19th May 1914 .	Petrol . .	Calcutta . .	While two Indians were examining empty tins and pouring petrol into them in a godown, a loud report was heard and the godown was set on fire. The men were badly burnt and subsequently died. The cause of the fire could not be ascertained.	2	...

APPENDIX I—*contd.*

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1914 to 31st December 1914—*contd.*

PETROLEUM—*concld.*

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons.	
					Killed.	Injured.
21	30th May 1914	Petrol	Seikkyi	Two men at the Indo-Burma Petroleum Company's Refinery were cleaning a pump in an Engine room and were using an electric light. The connecting wire of the electric light broke, and the spark produced coming in contact with the spirit set it on fire.	...	2
22	5th June 1914	Kerosine	Mymensingh	A lad used sealing wax to stop a small opening in a kerosine oil tin. Some ignited portion of the wax dropped into it and set the oil on fire. The fire spread throughout the room and the lad and three others were burnt fatally while the lad's father escaped with slight burns.	4	1
23	5th July 1914 ...	Kerosine ...	Calcutta ...	A Hindu woman was cooking food on a kerosine stove and in adding some oil to the stove the oil suddenly burst into flames and set her clothes on fire. She was fatally burnt (Newspaper).	1	...
24	28th August 1914 ...	Kerosine ...	Saharanpur ...	An Indian went to the manhole of a tank wagon to see if any oil was left in the tank when an explosion immediately occurred. It is presumed he had a light with him. The man fell from the tank wagon badly burned from the results of which he afterwards succumbed.	1	...
25	13th October 1914 ...	Petroleum ...	Seikkyi ...	A fireman of the Indo-Burma Petroleum Company who was tending a boiler burning liquid fuel was fatally injured by a blow back. It is presumed that the man fell asleep at his post and on waking up found that his burner had gone out and he set about hurriedly relighting it. When the man applied a light to the burner, the accumulation of gasses in the furnace must have caused the blow back.	1	...
26	28th October 1914 ...	Petrol	Dalla, Rangoon ...	A small fire occurred on board a small motor launch and was due to the serang accidently dropping a naked lamp while walking past the petrol tank. The serang was badly burnt and succumbed from the injuries received.	1	...
				Total ...	11	9
27	30th October 1914 ...	Acetylene gas ...	Calcutta ...	While attending to an Acetylene gas lamp an Indian put carbide of calcium into the tin receptacle of the lamp and after pouring water in it fixed the lid carelessly on the tin and having lit a match brought it near the burner in order to ignite the gas. An explosion occurred immediately fatally injuring the man. The lid of the tin was not securely fastened with the result that Acetylene gas escaped from the tin and got ignited by the lighted match.		
				Total ...	1	...

APPENDIX I—*concld.*

Summary of accidents during the year 1914.

Explosives or dangerous and inflammable substances.	ACCIDENTS CAUSING LOSS OF LIFE AND BODILY INJURY.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons Killed.	Number of persons Injured.		
EXPLOSIVES.					
Gunpowder	8	6	7	...	8
Nitro-compounds	3	...	5	...	3
Ammunition	...	...	...	...	...
Fireworks	6	5	21	...	6
TOTAL	17	11	33	...	17
PETROLEUM.					
Petroleum generally	9	11	9	...	9
TOTAL	9	11	9	...	9
Chemicals	...	...	...	...	...
TOTAL	...	...	...	...	...
Miscellaneous	1	1	...	...	1
TOTAL	1	1	...	...	1
GRAND TOTAL	27	23	42	...	27

APPENDIX J.

Detailed statement showing the number of accidents and persons killed and injured during the nine years 1906 to 1914.

Year.	GUNPOWDER.			DYNAMITE AND OTHER NITRO-COMPOUND BLASTING EXPLOSIVES.			AMMUNITION.			FIREWORKS.		
	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.
1906	13	21	28	2	1	2	...	...	...	11	4	14
1907	11	18	20	4	...	6	3	...	4	19	12	20
1908	19	27	64	4	1	4	1	...	1	22	26	23
1909	15	19	26	4	1	5	2	...	2	19	21	41
1910	9	10	11	4	1	4	...	...	...	21	30	58
1911	9	14	8	4	4	29	...	...	...	17	13	24
1912	10	13	6	5	5	35	1	...	1	12	4	16
1913	15	12	25	3	2	1	1	...	1	14	14	26
1914	8	6	7	3	...	5	...	...	...	6	5	21
TOTAL	109	140	195	33	15	91	8	...	9	141	129	243
AVERAGE	12	16	22	4	2	10	1	...	1	16	14	27

APPENDIX J—*concl l.*

Detailed statement showing the number of accidents and pers.ns killed and injured during the nine years 1906 to 1914.

Year.	Petroleum.			Chemicals.			Miscellaneous.		
	Number of accidents.	Pers ns killed.	Persons injured.	Number of ac i-dents.	Pers ns killed	Persons injured.	Number of accidents.	P rsons killed.	Persons injured.
1906	10	9	3	...	...	...	3	1	1
1907	15	9	8	...	...	...	6	7	2
1908	41	37	6	6	...	6	5	2	8
1909	23	17	25	3	6	6	5	4	13
1910	19	23	19	2	2	1	8	5	9
1911	30	21	35	2	1	1	6	299	27
1912	17	25	12	2	...	1	1	1	1
1913	12	19	19	...	...	...	2	...	3
1914	9	11	9	...	...	..	1	1	...
Total	176	177	136	15	9	15	37	320	64
Average	20	20	15	2	1	2	4	36	7

APPENDIX K.

Comparative statement showing the number of accidents and persons killed and injured during the nine years 1906 to 1914.

Year.	Accidents causing loss of life or bodily injury.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons. Killed.	Number of persons. Injured.		
1906	34	36	48	5	39
1907	50	46	60	8	58
1908	75	93	112	23	98
1909	70	68	118	1	71
1910	55	77	102	8	6
1911	64	352	124	4	68
1912	44	48	72	4	48
1913	46	47	75	1	47
1914	27	23	42	...	27
Total	465	790	753	54	519
Average	52	88	84	6	58

APPENDIX L.

Copy of letter No. 1994—2008, dated the 2nd October 1914, from the Chief Inspector of Explosive in India, Simla, to all Local Governments and Administrations.

I have the honour to state that several references have recently been made to me regarding the encroachment of distances required to be kept clear round petroleum premises under the rules under the Indian Petroleum Act.

2. To quote one case, a firm had erected a storage shed licensed for the storage of 5,000 gallons of non-dangerous petroleum, for which no distances are required to be kept clear under license Form A, within the distance area of a minor installation licensed in Form E.

3. As this Department only approves of plans and specifications for minor and major installations, *vide* Rules 7 and 8 of Chapter IV, Part II of the Petroleum Rules, and has nothing to do with the licensing of storage sheds for non-dangerous petroleum under license Form A, I have the honour to suggest that with the permission / if you* have no objection of His Excellency the Governor in Council / His Honour the Lieutenant-Governor in Council / His Honour the Lieutenant-Governor / the Hon'ble the Chief Commissioner authorities empowered to grant licenses for the possession of non-dangerous petroleum in Form A and dangerous petroleum in Forms B and C might be instructed to see before granting the licenses for such storage places that these storage places are not erected within the distances required to be kept clear round minor installations licensed in Form E or major installations licensed in Form D.

4. I would ask the favour of being informed of the action taken in this matter.

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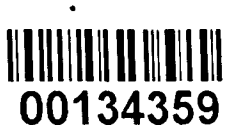
*For Chief Commissioner, Delhi, only.

1CIE—702—6-5-15—GCBP Simla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